AVIATION WEEK

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JULY 28, 1952

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NEWS DIGEST

Domestic

Three Sikorsky S-55s have been purchased by N Y Airways certificated helicopter operator with delivery scheduled one each this October, November and December. Several more are on option. The craft are scheduled to go into operation late this fall carrying mail between Newark, LaGuardia and Idlewild Airports under Post Office Dept. contract. Each will have 1,350 lb. payload. The S-55s will be fitted with gyros, full night flying equipment and radio.

Colonial Airlines directors have approved merger proposed by Eastern Air Lines providing for trade of three shares of Colonial stock for each two shares of EAL. Colonial stockholders will consider the proposal in September.

USAF has designated Phillips Petroleum Co. as operator of the Bluebonnet plant, McGregor, Tex., which will be used for production of solid fuel assist takeoff rocket units. Phillips was chosen from a list of 30 firms considered by USAF.

Top secret test bases at Invokern and Muroc, Calif., escaped major damage in last week's earthquake which devasted nearby Tehachapi.

Boeing XB-52 Stratofortress has been rolled out of Plant 2, Seattle following installation of equipment and is being readied for first flight test. Sister XB-52 has been flying ever since the middle of April.

Eight flying saucers reportedly were picked up on Washington National Airport radar scopes by tower operators at approximately midnight July 19 pinpointing "objects in vicinity of Andrews AFB, Md." The airport's traffic control center said that Capital Airlines' Flight 807 reported sighting of seven objects between Washington and Martinsburg, W. Va. Andrews AFB spokesmen said no interception was ordered because by the time they received reports no radar contact could be made.

Louis C. Huck, 55, president of Huck Mfg. Co., Detroit, died July 9. He organized the firm in 1933 to develop blind rivets, and automatic machines to make them. At one time he was vice president-general manager of Dornier Co. of America, General Motors subsidiary formed to make aircraft designed by the German firm. Huck was a private pilot since 1926 and was one of the original Quiet Birdmen.

ITALIAN TRAINER DELIVERY—Nine trim allmetal Piaggio P.148 primary trainers for the Italian air force lined up at Villanova d'Albenga prior to delivery. The P.148 is the IAF's new standard primary trainer after winning a competition.

USAF Republic Thunderjets ended 10,395-mi. flight from Georgia to Tokyo on July 16 in demonstration of rapid mobility of tactical planes between widely separated stations. Flight was completed by 58 planes (one exploded over Iwo Jima) using air to air refueling and island hopping methods. Planes, from 31st Fighter-Escort Wing, are expected to see combat.

Minneapolis-Honeywell Regulator Co., Minneapolis, has received a $4.5-million order from USAF for autopilots designed for Piasecki H-21 installation.

Boeing B-47 exploded in flight and then crashed into house in Marianna, Fla., killing its crew and two children in the residence. All B-47s on training flights from McDill AFB, Tampa, were called in and temporarily grounded.

Financial

Douglas Aircraft Co., Santa Monica, Calif., reports net sales of $196 million for the first half of the fiscal year ended May 31 compared with $97 million for the same period last year. But net earnings for the current first half were $4,383,680 after estimated federal taxes, a gain of only $674,800. On July 31 Douglas' backlog was $2.1 billion.

Beech Aircraft Corp., Wichita, Kans., reports sales for the first nine months of the current fiscal year totaled $66,983,567 and net income $1,219,916 after provision for federal profits tax. The firm declared a 20-cent quarterly dividend on common stock payable Aug. 5 to holders as of July 25.

Elastic Stop Nut Corp. of America, Union, N. J., reports profit of $742,364 after taxes and renegotiations for the six months ended May 31 on net sales of $11,358,669. A dividend of 25 cents per share payable Aug. 1 to holders of record on July 15 was declared.

International

Supermarine Swift jet fighter flew 200.38 mi. from London to Brussels at 665.9 mph.

IATA clearing house, London, handled $18,885,000 in interline transactions during May, almost $1.5 million higher than the previous record month of October, 1951. By offsetting credits and debit balances of member carriers 87.2% of turnover was settled without necessity for cash payments.

Italian Airlines plans to inaugurate N. Y. Paris-Rome and return deluxe service on Aug. 6 using Douglas DC-6s.

SO-6025, French jet fighter powered by Nene turbojet and SEPR rocket motor made its first flight June 10. Plane is the fourth prototype of the SO-6020 Espadon fighter.

AVIATION CALENDAR

July 30-31—University Aviation Assn. fifth annual meeting, Ball State Teachers College, Muncie, Ind.

Aug. 7-15—Aviation Education Leadership Institute, sponsored by CAA; co-sponsors AIA, ATA; first session in Commerce Dept. Bldg. auditorium, Washington, D. C.

Aug. 11-13—Society of Automotive Engineers national West Coast meeting, Fairmont Hotel, San Francisco.

Aug. 19-30—National Soaring Contest, Grand Prairie, Tex.

Aug. 27-30—National Flying Farmers convention, Alabama Polytechnic Institute, Auburn, Ala.

Aug. 30-Sept. 1—International Aviation Exposition, sponsored by Aero Club of Michigan, including Continental Motors Trophy Race, Wayne Major Airport, Detroit.

Sept. 1-7—Society of British Aircraft Constructors annual display, Farnborough, England.

Sept. 4—Centennial of Engineering banquet, Hotel Knickerbocker, Chicago.

Sept. 5-7—Preconference instrument maintenance clinic, Instrument Society of America national instrument conference, Case Institute of Technology, Cleveland. Send advance registrations to P. V. Jones, Instrument Society of America, Pittsburgh 33.

Sept. 8-12—Instrument Society of America seventh national instrument conference and exhibit, Cleveland.

Sept. 14-23—Aeronautical Fair, Forlanini Airport, Milan, Italy.

Sept. 15-19—International Air Transport Assn., eighth annual general meeting, Geneva, Switzerland.

Sept. 29-Oct. 1—National Electronics Conference, Sherman Hotel, Chicago.

Oct. 1-4—Society of Automotive Engineers national aeronautic meeting, aircraft engineering display and aircraft production forum, Hotel Statler, Los Angeles.

Oct. 9-10—Airport management operations conference, Oklahoma University, Norman, Okla.

Oct. 11-18—Fourth annual All Texas Air Tour; information available from Texas Aeronautics Commission, Austin.

Oct. 25-Nov. 2—International aviation and travel exposition, Navy Pier, Chicago.

Oct. 28-29—Transport Aircraft Hydraulics System Conference, sponsored by Vickers Inc., Hotel Park Sheraton, Detroit.

Nov. 6-7—National fuels and lubricants meeting, Society of Automotive Engineers, The Mayo, Tulsa, Okla.

Dec. 2—Symposium on light metal heavy forgings and extrusions for modern aircraft, Society of Automotive Engineers, Hotel Statler, N. Y.

Dec. 4-6—Sixth annual Arizona aviation conference, jointly sponsored by Bisbee and Douglas Chamber of Commerce, Douglas, Ariz.

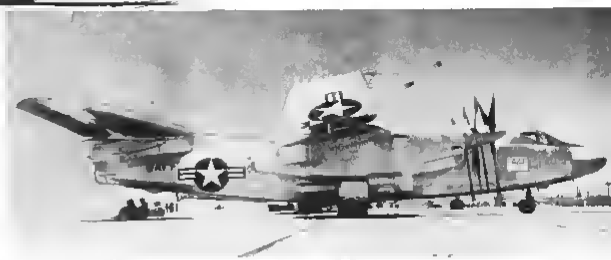
PICTURE CREDITS

9—Edgar Delgan; 13—(top) Republic Aviation Corp.; (center) Edgar Delgan; (bottom) McDonnell Aircraft; 14—Boeing Airplane Co.; 16—U. S. N.; 47—Boeing Airplane Co.

CONVAIR XF-92A—All white delta wing single seater is used to gather data for upcoming Convair XF-102 interceptor. Note the way main gear folds into fuselage, permitting thin wing design, also long emergency tailskid protecting extended tail-cone housing afterburner.

New Jets Seen During AWA Convention

DOUGLAS XA2D-1 SKYSHARK—Big, attack plane (left) with wings folded being towed before Aviation Writers at Edwards AFB, Calif. Powered by Allison T40 turboprop engine turning contrarotating three blade Aeroproducts props, the Skyshark is one of the planes being pushed for production by APB (see p. 13). It was initially ordered on limited scale. This plane is fitted with a streamlined auxiliary tank under the fuselage, carries two 20 mm. cannon in each center wing section.



NAA XA2J-1 SAVAGE—Largest carrier based plane flying is the big North American attack craft (right), shown here with wings and vertical tail folded. Powerplants are Allison T40 turboprops turning three-blade Aeroproducts props. Wings have "droop-snoot" leading edges, which improve the plane's takeoff and landing performance. The XA2J-1 only recently began its flight test program. It follows the smaller AJ 1, now in service, which is powered by two piston engines and has an auxiliary turbojet engine in the fuselage.

REPUBLIC XF-91—Also viewed by AWA members was this USAF interceptor (below), having variable-incidence inverse taper wings, four rocket motors in tail plus GE J47 turbojet. It has two 230-gal. underwing fuel tanks. Note way cockpit canopy hinges upward.

WHO'S WHERE

In the Front Office

Sherwood A Nichols, secretary, director and one of Transocean Air Lines' founders, has been named a vice president and also administrator of personnel and employment contracts He will also coordinate and direct the new Air Activities division, now fighting a locust plague in the Middle East

Changes

John W Rane, Jr., has been named director of contracts administration for Bell Aircraft Corp., Buffalo, N Y

Herbert P. Powell has been designated supervisor of contracts for Aerodex Inc, Miami Fla., contractor to USAF

Ralph I Cole, formerly technical director of Rome Air Development Center, N Y and **Vernon C. Weihe**, previously systems engineer with Air Transport Assn, have joined engineering staff of Melpar, Inc, Alexandria Va subsidiary of Westinghouse Air Brake Co

Victor N McNabb has been appointed manager of purchasing operations at Lockheed Aircraft Corp, at Marietta, Ga, succeeding **L. A. Thompson**

Richard E. Stockwell, formerly editor of Aviation Age, has joined Monsanto Chemical Co as editor of the Monsanto magazine

Paul W Rhame is now the assistant general manager of Allison division of General Motors, succeeding **Robert M. Critchfield**, now general manager of the Pontiac Motor division **D D Bowe**, has been made assistant general sales manager for Aeroproducts division of GM replacing **N. F. Trost**, recently promoted to quality control manager

Bert L. Snell has been promoted to assistant general sales manager of Luria Engineering Co, maker of aircraft hangars and industrial buildings

Hans Monhardt has been named manager of Swissair's administration department in New York

A V Fant has joined Aircraft division of White Motor Co as chief engineer He previously was with Convair as senior design engineer **A. N. Ballard** and **D J Halsey** also of Convair, also came to White Aircraft division as division manager and project engineer respectively

Honors and Elections

H Burroughes, Hawker Siddeley Group, has been elected president of the Society of British Aircraft Constructors for 1952-1953, succeeding **W T Gill**, who becomes deputy president **Sir Frederick Handley Page** has been re-elected honorary treasurer **J. J Parkes**, Alvis Ltd., has been made SBAC vice president Named to the management committee (in addition to those mentioned above) **Robert Blackburn**, **A. F Burke**, **H T Chapman**, **Sir Roy Dobson**, **Maj Sir Hew Kilner**, **H. G. Nelson** **J. D. North**, **F E N St. Barbe**, **Sir Frank S Spriggs**, **W R Verdon Smith**, and **C C Vinson**

INDUSTRY OBSERVER

► Pratt & Whitney has raised the price of its commercial R4360 engine after the plan to put the Wasp Major in one version of the Douglas DC-7 was abandoned Previously some airline customers, especially United, had considered using the Wasp Major for the DC-7 instead of the usual powerplant programmed—the Wright R3350 Reason for the Wasp Major proposal was that airlines already had some of the engines in their Boeing Stratocruisers and would not have to set up a new engine overhaul program

► Aerodynamicists are working to get back to unpowered control systems for higher-speed aircraft Many major companies are placing special stress on the avoidance of power boost controls wherever possible. NACA engineers are well along with several types of aerodynamically balanced flaps with goals of improved control effectiveness and lessened stick forces heading away from power boost.

► Hint that problems still remain for the turboprop powerplant may be taken from the fact that of all the 30-odd advanced airplanes shown to the Aviation Writers Association members at the recent Air Force-Navy show at Edwards AFB the only two turboprop-powered planes remained on the ground Conspicuously grounded while the turbojets did the flying were the Navy's Douglas XA2D and North American XA2J attack bombers

► Problems of improved lighting for aircraft instrument panels still are worrying the industry Some airframe company engineers feel the only ultimate solution is for instrument companies to modify their designs to be more susceptible to proper lighting Few changes in this respect have been made by instrument companies since World War II

► NACA is testing a scale model of a four engine turboprop plane closely resembling the Boeing B-47 except for powerplants The scale model turns 14-in diameter three-blade propellers with very thin blades and has been tested successfully in windtunnel airflow up to Mach number 0 92 at Ames Laboratory, Calif.

► While Douglas Aircraft sales engineers are talking up the new four-jet Douglas DC-8 transport—soon due for formal announcement—one of the old DC-8 prototypes modified for jets is still doing a workhorse job as a flying test bed for engine calibration at Edwards AFB. It is the old XB-43, first USAF jet bomber, long since outclassed in speed. It was modified to take jets from the XB-42, the old Douglas Mixmaster bomber which had pusher propellers at the tail, turned by a pair of Allison V171-0 piston engines buried in the fuselage. Originally Douglas planned a DC-8 commercial transport version of the Mixmaster configuration, but later it was shelved. The XB-43 carries two jet engines, one carefully calibrated as a yardstick to measure other types of turbojet engines which are flown against it.

► High temperature circuits required in some new aircraft and missile applications are causing a searching re-examination of wiring problems Some circuits are operational at temperatures around 600 F while copper wire has an effective limit at about 425 F. Aluminum wire and nickel clad copper wire are being tried

► Supersonic propellers are expected to have a prop disc loading as great as 150 lb thrust per sq ft, NACA engineers calculate But unless the very serious propeller noise factor at high rpm can be moderated, chances for public acceptance appear slight

► After Boeing's model 502 small gas turbine finishes a 50-hr qualification test which it is now running at Seattle, it is due for installation as the powerplant for a Cessna L-19 airplane. In a test stand run it is housed in an L-19 cowling and turns a fixed pitch McCauley aluminum propeller Normally rated at 175 hp., the little Boeing turboprop will do 210 hp for takeoff

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Defense Dept. Calls APB Plan Unrealistic

- **It would slow air power buildup, officials say.**
- **But AF, Navy must offer rebuttal by Aug. 6.**

By Ben S. Lee

Air Force and Navy are working at top speed to prepare rebuttal to proposals of W. L. Campbell, acting chairman of Defense Production Administration's Aircraft Production Board, which would completely disrupt present military aircraft and engine programs through the next five years.

Defense Department officials charge that the revolutionary measures by which APB's acting chairman would alter the present concept and state of readiness of military air power are not only speculatively idealistic but completely unrealistic and would result in failure to complete outfitting of a 143-wing air force and corresponding Navy complement of 16 air groups, 8 fleet air wings and 3 Marine air wings even by mid 1955.

Generally, Campbell asks Air Force and Navy to concentrate on modernizing the combat air fleets at the earliest possible date, to scrap obsolescent fighters, bombers and transports as well as their associated powerplant production immediately, and simultaneously to reduce the number of types designed to accomplish identical missions.

►**Board Members**—The recommendations were presented by Campbell to members of the Aircraft Production Board on July 9. Members of the board who listened to the detailed proposals: Assistant Secretary of Navy, Herbert R. Askins; Rear Adm. T. S. Combs; Lt. Gen. Orval P. Cook; Thomas J. Craven, Office of Defense Mobilization; Assistant Secretary of Navy for Air, John F. Floberg; Henry H. Fowler, representing both DPA and NPA; Vice Adm. C. W. Fox; Vice Adm. M. B. Gardner; Under Secretary of Air Force Roswell L. Gilpatric; John D. Redding, office secretary Defense Research and Development Board; and John D. Small, chairman of the Munitions Board.

Campbell, vested with executive powers handed down by the White House, has authority to inflict his decisions on the military.

Campbell has given Defense Department until Aug. 6 to answer the proposals and to show cause why the measures should not be adopted immediately and be incorporated as the crystalized aircraft production program and schedule.

►**Republic**—In the fighter bomber category, Campbell proposes that production of the Republic F-84C Thunderjet be curtailed immediately and that a stepped up priority for production of the sweptwing F-84F be undertaken in view of the superiority of the F over the G series.

►**North American**—Day fighter North American F-86F Sabre should be given the same treatment by Air Force as the F-84C, the APB chairman believes, with production of the F-86F being phased out as soon as sufficient deliveries of the North American F-100 (Sabre 45) can be attained. Superior altitude and supersonic speed characteristics of the F-100 over those of similar enemy types make it mandatory that priority be given to immediate production of the plane.

Stepped up production of the North American F-86D at the expense of Northrop F-89 and Lockheed F-94 production are urged because performance characteristics of the F-86D interceptor are superior when compared against capabilities of all models of the F-89 and F-94 series.

Further, Campbell said, similarity of the F-86D and F in general configuration lend themselves to mass production techniques. Their present production in widely separated plants makes them even more attractive both economically and from point of the generally accepted dispersal policy for military products.

Until the Consolidated Vultee F-102 delta-wing interceptor can be phased into major production as replacement for the F-86D, Campbell feels that dependence solely on the F-86D for interception is advantageous, not only because of general configuration of the F and D, but because they use the same powerplant, the GE J47 series.

►**McDonnell-Grumman**—In view of the apparent superiority of the McDonnell F2H series of jet fighters over the Grumman F9F series, Campbell recommends cancellation of the F9F series and conversion of that company's plant facilities to production of the F2H series.

For further mass production economies, Campbell recommends that Navy be restricted to one type of day fighter and that F2H series 2 and 3 be increased to meet the current needs of Navy. Additionally, he recommends that the Grumman F10F be canceled because performance characteristics of the McDonnell F3H just now entering production at St. Louis are superior to those of F10F series. The F3H-3 fighter, he feels, should become the ultimate general purpose version for Navy shipboard utilization.

►**Douglas**—Campbell suggests that Navy curtail production of the Douglas F3D-2 Skyknight in favor of the F4D-1 Skyray delta-wing fighter just now in flight test because of inferiority of the F3D series. He says however that production of the F3D series should be maintained until F4D series can be stepped up.

Campbell proposes immediate curtailment of the Douglas AD piston-powered series because these planes show very little advancement over those produced for Navy in World War II. Production of engines for this category he feels, similarly are not in keeping with future combat needs and contracts for such powerplants should be canceled as soon as turboprop successors can be phased in.

Instead, production of Douglas A2D series should be stepped up and phased in at the earliest possible date to succeed the AD attack bomber series. Campbell admits that there are problems in connection with A2D's Allison T40-A-6 turboprop engine despite the fact Allison officials believe the majority of the problems are whipped.

In this connection, he recommends that Navy offer full cooperation to Allison to perfect the T40 turboprop through assignment of additional Navy engineers and any civilian consultants Navy deems necessary.

►**High Priority**—As for the Douglas A3D (USAF B-66), just now being readied for flight test, Campbell asks that Navy concentrate on giving Douglas high priority to enable it to accelerate production of the twin-engined light jet bomber.

Further, he proposes that Air Force curtail planned follow on production of the British licensed Glenn L. Martin-built Canberra B-57A light bomber. Because of considerable disagreement within the Air Force over the relative merits of the B-57, plus agreement of interested segments of the AF that the B-66 can perform all operational missions for which the two ships are designed, Campbell asks that the B-66 be given top priority. In addition, he proposes that B-57 production be canceled as soon as B-66 production can be phased in.

The Boeing B-52 bomber program should be given particular emphasis at the expense of other bomber programs, Campbell said. Guidance on this proposal, it was explained, was based upon opinions obtained informally from experts in various government agencies concerned with the program, including research engineers within the military services.

Similarly, Air Force is urged to press for continued acceleration of the Boeing B-47B six-engined medium jet bomber as well as its four-engined counterpart, the B-47C, and not consider other types within the medium category.

►**Inspection Boards**—The APB chairman lashed out at Air Force and Navy

Buy These Planes and Engines:

Here in a nutshell are the sweeping recommendations for revised military plane and engine schedules spelled out to USAF and Navy by W. L. Campbell, acting chairman of Aircraft Production Board.

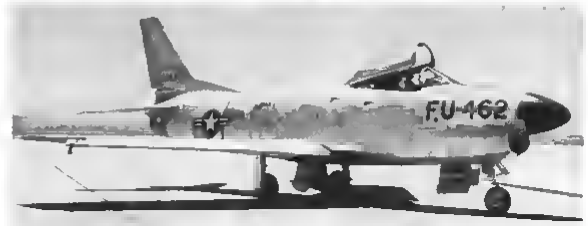
He told the two Services the following actions are requested as a result of the Aircraft Production Board staff findings:

- **Republic F-84F.** Reach a decision at once concerning Wright Aeronautical's ability to deliver J65 engines.
- **North American F-100.** Cancel F-86H program and direct the company to concentrate on F-100 Sabre 45 production.
- **Convair F-102.** Order Convair to step up production of F-102 delta-wing interceptors. Order a second source to tool for F-102 production with both prime and second source in major production by end 1954.
- **Boeing B-52.** Step up production of B-52 and give all component manufacturers any assistance deemed necessary for this accomplishment.
- **Douglas B-66.** Reconcile differences concerning relative merits of the Douglas B-66 with those of the Martin B-57A.
- **Allison J71-A-5.** Step up Allison contract to meet requirements for B-47C contracts.
- **General Electric J73-A-3.** Step up contracts with General Electric and Licensees Studebaker and Packard for engines required to support F-102, etc., production.
- **Pratt & Whitney J57-P-1.** Step up contract with P. & W. for J57-P-1 engines to support Boeing B-52 and RB-66 aircraft.
- **Ford Chicago J57.** Accelerate production of R4360 engines so that contract can be completed in time to use entire facility for Pratt & Whitney J57 production.
- **Ford Detroit J57.** Convert Ford Lincoln Mercury division to production of J57-P-7 immediately.
- **Chrysler J57.** Convert the Chrysler J48 production to J57 immediately.
- **Establish** one additional facility for major production of the J57. He recommends cancellation of the Westinghouse J40 and conversion of the Westinghouse facility to J57.

►**General Recommendations**—Campbell recommended in general that the Air Force and Navy cancel contracts for the F-89, F-94, F9F, and F10F, cut back contracts for the F-84C, F-86F, F-86D, B-36, and B-47B with associated cutbacks in engine contracts for those aircraft, and stepping up to brick bat priority: F-102, F-84F, F-100, B-66, B-47C, F4D-1, A2D and F3H aircraft.

He also recommended that "mock up boards" be restricted to not more than ten experts and that it be mandatory that their decisions be made within six weeks following inspection of mock up or prototype.

REPUBLIC F-84F sweptwing fighter is given high priority along with



NORTH AMERICAN F-86D under APB plan for Air Force planes. And the Navy's

McDONNELL F3H Demon series would be general purpose carrier-based fighters

for their cumbersome inspection system used in approving prototypes and mock-ups of new aircraft. He declared that in many instances inspection board memberships number more than 60 experts and that complete agreement of this entire group was necessary whether it was for a slight change in the angle of the pilot's back rest or need for additional equipment.

In most instances Campbell declared, the voluminous changes required from the inspection often called for complete redesign of the overall item. And in some instances, the manufacturer is not notified of changes to be incorporated for several months. This Campbell stated, only extends the already long development period and needlessly delays initial production of critically required aircraft.

► **Priority Assignments**—Campbell told the Air Force and Navy that he was completely at a loss in understanding the military assignments given certain projects. He asked Air Force and Navy to explain such apparent discrepancies as attachment of relatively low priorities to the Douglas A3D twin-jet bomber and Convair F-102 while production of the Grumman F9F series and Douglas AD bombers enjoy high priority assignments despite their obsolescence.

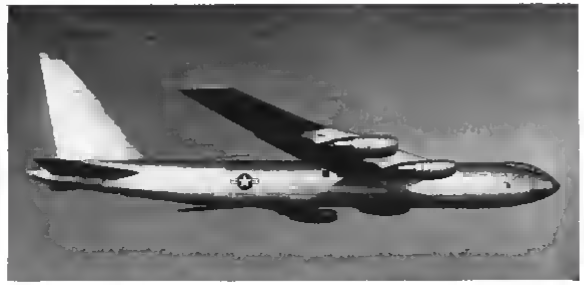
Campbell recommended to the services that they place Douglas bomber A3D (B-66) and Douglas F4D and Convair F-102 in "brickbat" priority category. Present priorities of these aircraft are so low, he said, that their manufacturers are virtually precluded from obtaining tools and materials for their fabrication.

He also told the services that in readjusting those priorities every consideration should be given to see that similar ratings be assigned for A3D, F4D and F-102 components—engines, electronic systems, etc.—needed for completion of the final weapon.

► **Contract Red Tape**—Campbell belabored Air Force and Navy for the extreme length of time required in placing contracts for aircraft each knew would be required to meet combat operational needs.

For example, he pointed out, Air Force first flew the Convair XF-92 (F-102 prototype) in September, 1948. By December, 1950, USAF had ordered material for only two F-102 production prototypes, and two years later in February, 1952 USAF had finally authorized nearly more than triple its 1950 order.

Despite the fact that Air Force considers the F-102 to be its top interceptor for some time to come, Campbell said, red tape methods of the unwieldy Air Materiel Command have been such as to permit only a trickle of F-102s to leak into production. This is a dangerous situation, he warned USAF and Navy, and it must be remedied immediately.



BOEING B-52 eight-jet bomber would take top priority in heavy bomber class

► **Engine Schedules**—Campbell declared that the contracts for the Westinghouse J40-WE-10 and -22 turbojet engine series should be canceled because of the delay thus far in development of the engine for production. The J40 currently is planned for installation in the Grumman F10F, McDonnell F3H and the Douglas F4D fighters.

It is felt by the APB staff, he said, that the J40-WE-22 will not have sufficient power characteristics to secure maximum efficiency as engine plant for the F3H and this group recommends instead installation of the Allison J71-A-6.

This group also is of the opinion, he declared, that the General Electric J73-GE-3 will provide a more efficient powerpack for the Douglas F4D than will the J40-WE-22.

In view of these findings, Campbell said, the J40 contract should be canceled as powerplant for presently contemplated aircraft production. However, should the engine eventually develop satisfactorily it could be reconsidered in future planning.

The Allison J71-A-6 is ready for production and if contracts are placed promptly, he said, its production will be sufficient for delivery of a considerable quantity to McDonnell by late fall.

► **Expedite J71-A-5**—Because the Boeing B-47C will require the Allison J71-A-5 and in view of other requirements for the Allison turbojet and turboprop engines, he said, the staff feels that the Allison series should be expedited.

Considerable attention also should be given, Campbell said, to stepping up production of the General Electric series of turbojet engines. The J73-GE-3 will be required as powerplant for the Convair F-102 and is considered a satisfactory powerplant for the F4D-1 as well as the F3H-3.

Because of the considerable difficulties, strikes, etc., faced by GE and in view of the increasing demands for this series, Campbell recommended that both Packard and Studebaker be ordered to convert to J73 series. Currently, he pointed out, both are licensees of General Electric in manufacture of the J47 and since the J73 is only a further development of that engine the transition should not be difficult.

► **J57 Program**—Campbell recommended that particular emphasis be given by Air Force and Navy to expediting the Pratt & Whitney J57 P-1, P-7 and P-5 turbojet engines. In accordance with his proposal for stopping Westinghouse J40 production, he suggested that the Westinghouse facility be given over to J57 production.

Further, he recommended that both Air Force and Navy do what they can to eliminate shortages which threaten planned production tempo at the Ford Chicago plant. He said his office would lend any assistance deemed necessary in the military in that accomplishment.

He suggested that Navy cancel production of the Pratt & Whitney J48 scheduled for the Chrysler Corp. and that Chrysler should be ordered to tool for the J57-P-7 and subsequently the P-5. These engines eventually will be power plant for North American F-100, Convair F-102, Douglas B-66 and its Navy counterpart A3D.

To further augment J57 production Campbell recommended that the Ford Lincoln-Mercury division now tooling for production of Westinghouse J40 should tool for production of the J57. He said he had been informed by officials of Ford that conversion to J57 P-7 would not be difficult inasmuch as basic tooling for both these engines is the same.

► **Sapphire Status**—Campbell said contracts for Wright Aeronautical division's J65-W-3 and W-5 "Sapphire" jet engines should be canceled in view of the situation existing at the company with respect to completion of engineering for production of the J65. Thus undue delay, his staff feels, is due to improper topside management. He told the Air Force immediate corrective actions should be taken and commended USAF for the efforts it already had made in this direction. If corrective measures are immediate, he said, it is still completely within the realm of possibility that the J65 could be produced for the F-84F and B-57A.

Wright also has been charged with responsibility for the production of the J67 Olympus turbojet engine for supersonic flight aircraft to be produced after 1955. This program as with the J65, he said also is bogged down and must be dealt with accordingly.

► **APB Position**—Campbell told the military services that industry and civilian defense agencies are considerably disturbed by the "unwieldy" aircraft procurement procedures now in effect. He declared that bottlenecks in the various aircraft programs must be eliminated if the posture of the 143-wing Air Force and related Naval Aviation force levels are expected to be attained.

At the same time, Campbell emphasized that he was not advocating a "design freeze." Such a program at this time would be fatal, he said. However, increased research and development work should be undertaken by the Air Force and Navy so that when the decision is made to press for mass production, a wider choice can be available than is now possible.

Nevertheless, he said, continuing production of obsolete and obsolescent aircraft is only resulting in a pipeline full of aircraft whose performance characteristics are inferior to those of the enemy.

Aircraft Production Board staff is of the opinion that duplicate production of specific mission planes is wrong because that type of operation requires duplicate pipelines, parts, assemblies and sub-assemblies, etc.

► **Military Position**—Top Air Force and Navy Air officials are of the joint opinion that present schedules for delivery of airframes, engines, electronics, etc., are in strict accord with present industry production capabilities.

Airframes and engines, they say, can serve no useful military purpose unless they incorporate necessary electronics and armament equipment which has undergone a thorough test period that will result in not just an airplane but a complete and effective weapon.

For example, the introduction of new models of aircraft into production involves a certain calculated risk. It is not at all unusual, Air Force sources say, to order an aircraft and its complement engine into production while associated equipment—electronics, armament, etc.—are still undergoing accelerated test.

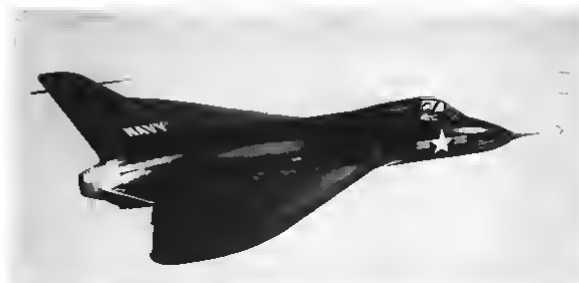
However, during this period of expectant waiting, while the complete weapon is in "final assembly" and test, continued production of existing aircraft must be maintained because:

- If the new end item fails to come up to paper expectations or is delayed through components manufacture, a production of a current plane must be constant in the event of war.
- In order to arrive at the authorized 143-wing USAF and planned Navy structure, there must be continuing production of models capable of being mass produced in large quantities.
- Air Force and Navy have certain immediate needs such as defense of the U. S., Alaska, and planes for forces in Europe and the Far East which must be fulfilled before any newer and more desirable equipment can be procured.

Most important Air Force and Navy officials state, the military commander in the field cannot use a design or production program. Instead he must have combat aircraft and must have had them long enough to have air crews expert at using the weapons and ground crews expert at maintaining them.

► **AF View**—As an example, Air Force said it is in perfect accord that the F-100 is superior in performance to the F-86F. However, in the time that the F-86F can be produced—before the F-100 is available in quantity—USAF is faced with the alternative of having many combat organizations equipped with the F-86F or nothing comparable.

Decision by the military to rely on single types or aircraft would be dangerous, both Air Force and Navy argue. There have been instances in both services where a particular type of aircraft has been grounded because of malfunctioning equipment. If Air



DOUGLAS F4D sweptwing Skyray fighter would get nod over F3D-2 Skyknight

APB's Authority

Aircraft Production Board Acting Chairman W. L. Campbell draws his authority for administration of U. S. aircraft programs from executive powers delegated to him by the Defense Production Administration, established by executive order of the President, Jan. 3, 1951.

DPA is vested with authority to "perform the central programing functions incident to the determination of the production programs required to meet defense needs. Make determinations as to procedures and methods followed by executive agencies with respect to the accomplishment of defense production programming, including those with respect to purchasing, contracting and specifications."

APB as a function thereunder is additionally charged with responsibility for "the control direction of the aircraft production program. . . . Responsibility for the overall coordination of aircraft production program. It determines through established agencies the total requirements, including military, commercial and civilian, for aircraft and recommends the allocation of the available supply of production resources for the aircraft production program. . . . Formulates and recommends policies and procedures for insuring required production, including scheduling of aircraft components, materials, expansion of facilities, production equipment, conservation, and related matters. . . ."

Force, for example, relied upon a single type of day fighter and a grounding order was issued, then combat effectiveness of the entire USAF would suffer.

Any deceleration in the present aircraft and engine schedules for a reorganization or realignment of production objectives would result in a break-up of the vast, recently completed subcontract structure of the two services, they say. It would discourage participation by these manufacturers outside the aircraft industry. And it would necessitate re-establishment of those firms at a later date when production of newer models could more easily be accelerated.

Each cut and stretchout, both services agree, results in actual dollar losses to the subcontractors. These proposals and/or procedures make the subcontractors even more reluctant to discontinue civilian lines of production in favor of military when their past experience has been that schedules on which they had planned were somewhat reduced or, in some cases, discontinued entirely.

Hawker Siddeley Eyes Australia

(McGraw-Hill World News)

Melbourne—Hawker Siddeley Group plans to extend manufacturing activities to Australia.

The big British gas turbine engine and aircraft combine will first build a repair and maintenance plant probably in South Australia, to be followed by a facility for making long-range weapons. Contruction of jet engines and aircraft will depend on backing from the Australian government and on manpower supply.

Production costs here are high. But Hawker Siddeley officials believe these could be reduced by purchasing certain items and raw materials from countries such as India, Pakistan and New Zealand.

"Corridor" Insurance

(McGraw-Hill World News)

Frankfurt—German insurance companies have decided that they will not invoke the "war clause" in their policies against passengers injured in attacks by Russian planes on allied craft flying the Berlin corridor.

But insurance officials say that repeated attacks would lead them to infer that they were a result of Soviet military policy and they would have no recourse but to invoke the war clause freeing them of legal responsibility.

Kimball Calls for Ideas, Gets Them

Navy Secretary finds IAS members already delving in fields he stressed at West Coast summer meeting.

By William J. Coughlin

Los Angeles—Navy Secretary Dan Kimball told members of the Institute of Aeronautical Sciences at the opening of their summer meeting here that the lure of aviation is somewhat the same as that which inspires men to crawl underground to see what there is in a dark cave.

He urged the Institute to give free rein to the "young brains" of the industry and full support to the new theories which now may be but a gleam in the eye of a young engineer or a scrawl in the notebook of a young scientist.

"Is there an idea in the house?" he pleaded.

At the Institute seminars which followed, the "young brains" demonstrated that they have indeed been busy crawling into the dark caves of aviation's unexplored areas and coming out with new ideas. The men who mounted the podium in the Institute's modernistic building next door to the Hollywood Baseball Park could sometimes have been mistaken for the athletes working out nearby in the hot California sun. Many were younger than 40 and some under 30. The members of the Institute gave respectful attention to their young ideas.

▶ **Guided Missiles**—Secretary Kimball pointed out that the supersonic guided missile has brought new and more difficult development problems and that more genius is needed not only in missile design but also in the devising and interpreting of design tests applicable to missiles.

• In an aerodynamics seminar, Robert T. Jones of NACA's Ames Aeronautical Laboratory came up with a method to determine mathematically the minimum drag of wings at supersonic speeds.

• Donald Coles, research engineer at Cal Tech's jet propulsion laboratory, produced data on measurements in the boundary layer of a smooth flat plate in supersonic flow from Mach 2.0 to 4.5.

• Cornell University's Mac C. Adams and W. R. Sears introduced a more accurate theory on the flow about slender bodies and wings and poked holes in some of the old theories on the subject.

• Harold F. Stemmetz of McDonnell Aircraft presented a method for estimating more accurately the aerodynamic resistance of a supersonic missile to rolling motion. He found that neglect in calculating wing-body interference on the tail while estimating roll damping had resulted in large errors.

▶ **Power Plants**—The Secretary of the Navy called for attention to the power plant field as he urged the aeronautical scientists to keep up a continual search for new tricks.

• Frank F. Rand, Jr., of General Electric told a propulsion seminar that a shock wave ignition for engines of the ramjet type will offer many new advantages, including less bulky engines, weight saving, self-starting operation and elimination of flame holders.

• Prof. A. L. London of Stanford University came up with a solution for the regenerator-turboprop engine which promises to solve some of the volume and weight problems of the direct transfer-type regenerators. His answer: a liquid-coupled system with separate air and gas flow areas, taking advantage of work now being done in the nuclear power field on liquid metals as a heat transfer medium.

▶ **Metallurgy**—Secretary Kimball noted that painstaking research and hard work in the development field have brought many advances in the field of light alloy and special-alloy metallurgy, but called for still greated endeavors on the part of researchers.

• North American Aviation's R. R. Templeton told an Institute session of research with titanium that promises good strength/weight ratios at high temperatures.

• Alcoa's John Faulkner and John Alden presented a paper telling of new equipment being installed at the Aluminum Co. for work with tapered sheet, wide ribbed extrusions, big forgings, rolled shapes and also ribbed sheet.

▶ **Pilots**—Secretary Kimball strongly rejected the "kamikaze principle" of warfare and urged the aeronautical scientists to give full consideration to the men who fly their machines since "as a nation devoted to respect and protection of individual dignity, we oppose the doctrine of the expendability of the individual."

• Design safety engineer William I. Stieglitz of Republic Aviation argued at the final session for more consideration of the pilot. When the demand on the pilot exceeds basic human limitations and an accident results, it is design error, not pilot error, Stieglitz asserted. Since you can't change man, you have to tailor aircraft design to the man, the Republic engineer pointed out. His fervent plea for more thought of the pilot was received with the strongest applause of the entire Institute meeting.

So it went in session after session. Members of the Institute revealed they were hard at work in the very fields which Navy Secretary Kimball felt were most important and deserved the highest endeavor. But at week's end, the aeronautical scientists still had offered no solution for one problem which the Navy's top official had posed at their opening dinner.

Kimball had urged that some way be found to relieve the best brains in the research and development field of the economic necessity of earning a decent living.

The "young brains" of the Institute of Aeronautical Sciences haven't yet solved that one. But each one probably had some personal ideas as to the solution of this problem.

Steel Shortage Pinches Air Industry

Aircraft parts and components manufacturers' production is beginning to be affected and will continue to deteriorate rapidly "as a direct result of the steel strike," Admiral Dewitt C. Ramsey, president of the Aircraft Industries Association, reported last week.

Ramsey said that while the entire industry will be affected the smaller components manufacturers will be hit hard first, probably about Aug. 1.

From that date on, the trend is expected to snowball until Sept. 15, when "It is believed there will be a complete stoppage of jet engine production and deliveries," Ramsey said.

Pratt & Whitney division of United Aircraft reportedly will begin cutbacks on scheduled deliveries of engines and parts to USAF and Navy and will start personnel layoffs by Aug. 11.

Ford Motor Company reports that it is "stretching trickling steel supplies as far as possible in view of soaring unemployment in the industry (aircraft engine, and motor car)." Ford said it probably would be compelled to lay off some of its employes either this week or next.

Air Force officials said that the general shortage of steel as a direct result of the strike, now in its 51st day (last week), already had forced some revision of engine and component delivery schedules.

Admiral Ramsey said that although airframe manufacturers have enough high alloy steel to meet their day to day requirements for the time being, they still are being retarded by not being able to obtain immediate delivery of all the various sizes and types of high alloy steels.

Air Bases

- **USAF gets only about half its 1953 request.**
- **Delay in getting work started is blamed.**

By Katherine Johnsen

Air Force's blueprinted $10-billion world-wide base structure to back up a 143-wing striking force will not be completed before mid-1956 at the earliest.

And, unless the program, lagging far behind USAF's personnel and procurement programs to implement the 143-wing force, is radically stepped up, its achievement will be prolonged years beyond this optimistic target date, Washington observers believe.

Air Force slowness in getting work underway and numerous changes in plans, together with congressional skepticism toward the program—due to discoveries of waste of public money on some projects and hesitancy at becoming involved in foreign politics which goes with maintaining installations on foreign soil—are factors contributing to the lag.

▶ **Only Part of Request**—For the current 1953 fiscal year, which started July 1, Congress allowed USAF $1.2 billion to implement the base program—only about half the $2.2 billion USAF had asked as a first increment for the year. Spokesmen had testified that a total of about $3.6 billion would be required for 1953. The program will be put to another congressional test when AF asks for additional money in January.

The base program was launched shortly after the June 26, 1950, Korean aggression. The $3.6 billion appropriated for the 1951 and 1952 fiscal years was to implement a 95-wing force. The $3.6 billion USAF wants for 1953 and the $2.9 billion it plans to request for fiscal year 1954 are to expand the structure to support a 143-wing force.

With a lead time of 20 to 24 months on base construction, projects undertaken with 1954 fiscal year funds would be completed in the last half of the 1956 calendar year—or about a year after USAF expects to have the aircraft on hand for a 143-wing force.

Congress took this action on the air base program:

• Authorized a $1.8-billion program, instead of the $2.2 billion USAF requested.

• Generally, project funds were trimmed. However, three projects were eliminated: $73-million development of a modification and staging center at Hammonton, N. J. AFB, $1.6-million expansion of Baltimore headquarters of Research and Development Command, and $1-million expansion of Dobbins AFB at Marietta, Ga. Senators wanted to give the Hammonton project further consideration because of the large outlay involved. Aside from the headquarters project, all funds requested for expansion of research and development facilities were approved.

• Appropriated only $1.2 billion, though, to implement the $1.8-billion authorization.

• Struck out $250 million, Defense Department wanted as a U.S. contribution toward building up the NATO tactical base structure. House Armed Services Committee proposed that this should be authorized under mutual security legislation. But mutual security legislation had already been passed when the committee made its suggestion in the closing days of the session, and Congress adjourned without providing for the $250 million U.S. participation in European bases.

• Further evidenced its doubts on the overseas base program by instructing Defense Department to notify the Armed Services Committees of the terms of agreements for foreign base rights before moving forward with construction.

Lion's share of the $1.8 billion authorized program, $1.3 billion, is for Strategic Air Command—expansion of "at home" bases and construction of a world system extending from the Far East, across the southern part of Asia, across North Africa, across the west of Europe and back through the northeast approaches of the U.S.

McCone Offers Reply To Rep. O'Konski

Former Air Secretary John McCone has offered to appear before the House Armed Services Committee to clear what he called "an attack on my integrity while in public office" by Rep. Alvin O'Konski. The offer went to committee chairman Carl Vinson with a copy of a letter to O'Konski asking the latter to correct the record.

O'Konski had contended (AVIATION WEEK June 2, p. 12) that McCone, now board chairman of Joshua Hendy Corp., was a link in industrialist Henry J. Kaiser's "chain of influence" in Washington.

The committee now is looking into Kaiser-Frazer Corp., which is under contract with the Air Force to produce the Fairchild C-119 cargo plane at K-F's Willow Run plant.

In his letter to O'Konski, McCone stated among other things that he has no business connections with Kaiser and has never been in his employ.

Combat Alert

- **Night alarm looked like real thing last April.**
- **It wasn't—but we learned much from it.**

Air Defense Command last week released full details of a grim occurrence in mid-April which received little mention in the press, but threw the nation's military might into a readiness alert.

Although the alert was fortunately a false alarm, the military services learned many valuable lessons from it. Weak links in U. S. defense—especially in communications—were uncovered and are today being corrected where possible, as a result of this unrehearsed potential combat situation.

▶**How It Began**—On Apr. 16, Air Defense Command intelligence was analyzing an accumulation of intelligence material concerning massing of Russian aircraft just across the polar wastes in Russian territory at "X." The intelligence data was discussed with the various commands under ADC and finally "filed" for further summation.

At 25 minutes past midnight on the morning of April 17, Combat Operations Center received word that four vapor trails at high altitude, heading toward western U. S., had been sighted over Nunivak Island off the coast of Alaska 1 hr. 27 min. earlier.

At 3:10 a.m. combat operations received a report from Eastern Air Defense Command that five unknowns had been charted coming in over Presque Isle, Maine.

With that additional information the Air Defense Command of the Royal Canadian Air Force was notified. About this time, Air Defense Command tried to clarify the Nunivak sightings by contacting Elemdorf AFB, Alaska, only to learn that all the communication lines to Alaska were inexplicably out.

▶**Alert Is On**—The alert was on. Calls went back and forth between Eastern, Western and Central Air Defense Commands and to the top Air Force command in Washington. The entire situation was reviewed and an "enemy" ETA at Seattle was computed for the Nunivak sightings at 300 knots. They could not, ADC figured, hit Seattle radar nets until about 4:30 a.m., with an hour and a half to go. At the same time, figuring the airline distance from Alaska to Seattle—or to Chicago—, just about the same—and, with the receipt of the Presque Isle sightings, Air Defense Command went on full combat readiness. The time was 3:11 a.m., Apr. 17.

Hot line calls were placed to the three Air Defense Commands, to the Strategic Air Command, and to Air Force Headquarters. At the same time, Tactical Air Command, Air Research and Development Command, Air Proving Ground and Air Training Command were notified to advise what subordinate commands should be notified.

Combat crews were red-alerted to bases; all combat aircraft were placed in readiness and all logistics functions were ordered into action. Full time nationwide aircraft and warning network had been alerted and swung into operation.

Army was notified and alerted its anti-aircraft units, and sea frontiers commanders were notified and stood by should the emergency develop.

▶**Communications Out**—Meanwhile communications with Alaska were still out and the Presque Isle radar tracks were narrowed down to a positive three unknowns. Fully armed Air Defense Command interceptors took off on interception missions. The three unknowns were identified as an Air France Constellation, a British Overseas Airways Corp. Constellation and a Pan American Airways Stratocruiser.

All three planes had been properly cleared but had been far off course as a result of weather. The pilots of the planes had notified proper ground stations of new flight plans but, again, ground communications failures at two Canadian stations prevented the new flight plans from reaching Presque Isle.

When communications with Alaska were finally re-established, it was learned that the contrails reported over Nunivak had never reappeared. As for the activity "X," Intelligence decided that it lacked the significance that it had been given initially.

And yet, it could well have been the indicator for attack on the U. S.

President Signs Research Measure

Legislation to facilitate military research and development programs has been signed by the President.

The measure provides:

- For the appointment of privately-employed advisers, as considered necessary in carrying out research and development activities, at a rate of not more than $50 a day.
- For employment of scientific and technical persons not citizens of the U. S. on research projects.
- Authority for the services to enter five-year research and development contracts and make five-year renewals.
- Permission for the services to furnish contractors with necessary research, development or test facilities, subject to adequate protection of the government's interest.
- Authority for the services to indemnify contractors against liability and loss arising from injury or damage in connection with work on research and development contracts.
- Authority for the services to simplify vouchering procedures.

ANDB Now Studying Cockpit Visibility

The Air Navigation Development Board has launched a program to find better ways to measure and report airport weather conditions so pilots can know accurately in advance the distance they can expect to see from the cockpit during the final phases of an instrument approach. ANDB expects the program to improve aviation safety considerably.

Sperry Gyroscope Co., will conduct the two-year research program and is expected to fly 1,000 test approaches under low ceilings at MacArthur Field, Long Island. Sperry has conducted its own instrument approach tests on automatic approach couplers and Zero Readers at MacArthur for the past several years.

▶**The Need**—An almost universal pilot complaint is that presently used weather criteria (ceiling and horizontal visibility) do not accurately forecast visibility from the cockpit or the height at which the pilot first sees the ground during an instrument approach (AVIATION WEEK, April 14, 1952, p. 65). The recent International Air Transport Assn. conference in Copenhagen called for the type of program ANDB now has initiated.

Installation work on ground and airborne equipment required for the program has been under way at Sperry since late in June. When completed, ground observers will use two newly developed U. S. Weather Bureau ceilometers on the final approach path to measure ceiling and a transmissometer to measure horizontal visibility. A photometer will measure sky brightness, and a series of targets has been set up along the instrument runway as another measure of visibility.

▶**Test Plane**—The DC-3 test plane will carry four technicians in addition to the flight crew. Flight recorders will give a complete time history of the bad weather approaches, including the instant when the crew first sights the ground below, the approach lights and the runway threshold. These will later be correlated with observations and data taken by ground crews.

Weather Bureau will provide engineering and technical assistance to Sperry in carrying out the ANDB program. Sperry intends to make all test approaches using its A-12 autopilot and associated approach coupler in order to assure uniform, repeatable approaches.

Trained Personnel Needed for Analyzers

- **Devices proven worth stressed at conference.**
- **Unsettled question: Which is best type?**

By George L. Christian

Deposit, N. Y.—Electronic analyzers, both ignition and engine, are rapidly taking their place as essential pieces of aircraft in the air and on the ground, but lack of sufficiently trained personnel stymies their maximum utilization at the present time. This has been revealed at the ignition and engine analyzer conference, sponsored by Scintilla division of Bendix Aviation Corp.

Two American manufacturers—Scintilla division and Sperry Gyroscope Co.—have sold or have on their books an impressive total of over 6,300 units.

- Scintilla lists 4,000 instruments sold or contracted for.
- Sperry lists over 2,300.

In addition, a foreign manufacturer, British-Thomson-Houston, is making analyzers, but has not announced its sales. And a brand new U. S. analyzer, the Landair, was announced by B. Puchaski, assistant to the president of California Eastern Airways.

▶**Varied Customers**—Scintilla trotted out a list of 60 customers, including the military services, airlines, engine manufacturers, ground test installations, and several foreign concerns.

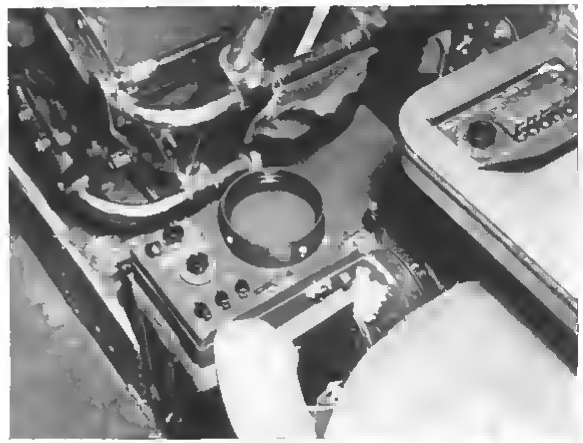
Sperry showed a total of 74 customers, domestic and foreign.

All Scintilla analyzers are ignition only. Of Sperry's total, 173 are engine analyzers with vibration pickups included.

Although a majority of the discussions at the three-day conference revolved around the Scintilla analyzer, the Sperry unit came in for considerable comment, and occasional mention was made of the BTH instrument. Impartiality prevailed at the meeting.

▶**Versatile Device**—Robert Boyer, Jr., Scintilla senior sales engineer and chairman of the conference, stressed the versatility of the electronic analyzer. Not only will it trouble shoot aircraft engine ignition systems, he said, but it will also pick up certain types of mechanical troubles such as piston ring failures. It can also be used to track down aircraft heater ignition troubles.

Expanding on the versatility of the instrument, he asserted that an airline could easily use it to check out its automotive equipment, with savings to the carrier. He envisions in the future still other uses of the analyzer to troubleshoot many other aircraft components, greatly enhancing the value of the unit.



Bendix airborne analyzer is mounted on floor behind co-pilot on Connie.

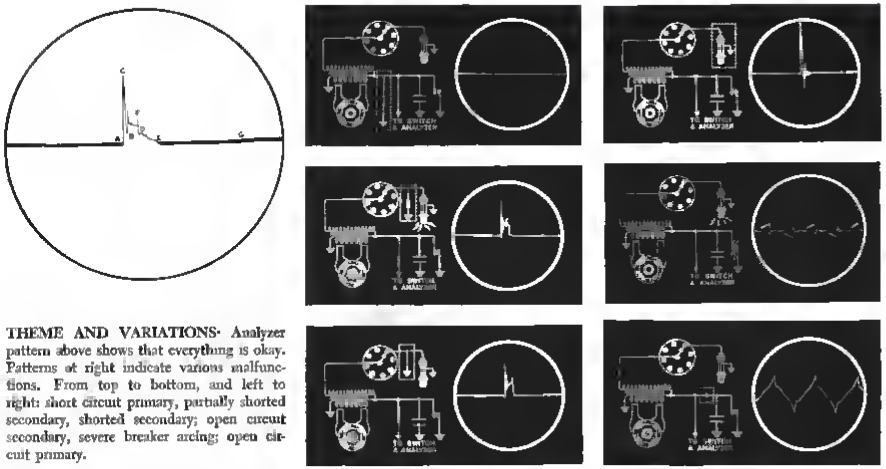
▶**Conference Highlights**—Highlights of the meeting were:

- **Analyzers can save** their users much time and money, but well-trained personnel are essential. And training is no one-shot deal, it must be a continuing program to be effective.
- **Portable-airborne analyzers** appeared to be the most popular version of the instrument, but airborne configurations came in for favorable comment.
- **Analyzer experience is limited** among airlines. At least two carriers admitted that they did not take action on an analyzer indicated malfunction unless other engine instruments corroborated the analyzer's findings or if the pattern on the scope were clearcut and not questionable.
- **Engine and spark plug** manufacturers find the analyzer useful in their experimental and testing programs.
- **Better engines** come out of airline engine test cells equipped with analyzers.

▶**Analyzer Benefits**—Major analyzer advantages as seen by the conference, are detecting incipient engine troubles, allowing pilots to feather engines before they destroy themselves, turning engine changes into cylinder changes, reducing or eliminating delays at originating and through stations caused by engine trouble, detecting malfunctions which no other instrument could find, lowering considerably unnecessary spark plug and magneto removals, and generally contributing to greater safety and better on-time performance of the airlines.

▶**Three Types**—Scintilla lists three versions of its analyzer:

- **Portable.** With this instrument, the aircraft carries no analyzer components. When put to use, pickups have to be attached to the engine and a synchronizing unit mounted. Advantage of this rig is that no additional weight is loaded into the aircraft. Disadvantage, according to airlines that use it, is the time it takes to make the installation (about —1½ hr.) discourages mechanics from checking the analyzer out of stock and hooking it up. Normally they prefer to resort to the usual means of trouble-shooting, replacing spark plugs, magnetoes, etc., according to the symptoms given by the engine during the course of its service.
- **Portable-airborne.** All the basic wiring is permanently installed in the aircraft and each engine mounts a



THEME AND VARIATIONS· Analyzer pattern above shows that everything is okay. Patterns at right indicate various malfunctions. From top to bottom, and left to right: short circuit primary, partially shorted secondary, shorted secondary; open circuit secondary, severe breaker arcing; open circuit primary.

synchronizing breaker assembly. In addition, radio interference filter, relay-resistor box, panel assembly and a lead storage locker are in the aircraft. Numbers of each component depend on the type of plane and number of engines. The analyzer, normally kept at a ground station, may be quickly plugged into the leads in the aircraft and immediately put to use when trouble requires. Consensus of opinion at the conference was that this was probably the most desirable installation. Weight penalty for this configuration averages about 15-20 lb per airplane. Analyzer weighs 25 lb. more.

• **Airborne.** In an airborne installation, the analyzer is permanently installed aboard the aircraft. Advantage is that it is available at all times for instantaneously checking any malfunction as it develops during flight. Its indications may lead the pilot to feather the engine to save it from total destruction or from becoming a hazard to the plane, or it may show him the trouble is insignificant and that he may keep on pulling power.

Negative aspects of the airborne configuration are that it adds about 25 lb. of weight and requires a much larger inventory of analyzers since each aircraft carries its own. A crew of three men is almost mandatory in order to provide someone constantly to monitor the scope.

►**Vibration Pros & Cons**—A summary of two and a half years experience with detonation equipment was presented by **William L. Bowler, project engineer,** Wright Air Development Center, USAF.

Starting in 1938, investigation into vibration analysis was undertaken to extend engine life, reduce flight aborts and evaluate detonation.

Initial problems with vibration pick ups have now been solved with units which will last an engine run.

Bowler said that there is no question that existing Sperry equipment will indicate vibration malfunctions. It is extremely valuable to determine valve clearances dynamically and it can pinpoint a wide variety of valve, valve guide and valve spring problems.

Difficulties associated with airborne vibration equipment, according to Bowler, are increase of weight (59 to 246 lb. on an R4360 engine with pick-ups on seven mags and 28 cylinders), large number of components, and complication of the harness.

Interpretation of vibration patterns is not always easy, "... leaves a lot more room for experts," Bowler added. Result is that training problems are considerable.

The equipment is carried on 42 aircraft (B 36s, B-50s, C-97s) at eight air bases. Four bases have come out strongly in favor of vibration analysis—"... they live by it," Bowler said; the other four are against it, indicating the wide divergence of opinion concerning the equipment.

Bowler said that USAF uses vibration analysis for test cell work. "If it can determine malfunctions at overhaul, its airborne usage will probably be reduced." A full report on WADC findings should be available by September of this year.

Other comments:

• **TWA—Norm Parmet, project engineer,** said that TWA was using Sperry analyzer equipment on test cells. The airline is also evaluating both Sperry and Scintilla airborne equipment on Constellations. The Sperry analyzer does not include vibration pickup. He explained that, as far as TWA was concerned, vibration analysis was only useful if a complete survey were made. A single cylinder pickup is not worthwhile.

• **PAA—W. W. McClintock, powerplant service engineer,** said PanAm uses Sperry airborne equipment on its Model 049 Constellations and Boeing Stratocruisers. On the Boeing, PAA installed one vibration pickup per engine. But so many cylinders gave trouble, that the lone pickup was not worthwhile and was removed.

• **LASI—**A Lockheed Aircraft Service-International engineer revealed that his company is successfully installing Sperry airborne analyzers, with complete vibration wiring, on ten USAF VIP C-121s. LASI has also made a practical installation of a Scintilla airborne analyzer in three El Al Israel Model 049 Connies and has supplied KLM with complete engineering data and drawings for similar mounting in its 749s. LASI is prepared to supply kits for such installations on Constellations.

The complete Scintilla analyzer is installed on the floor of the cockpit, scope side up, directly behind the co-pilot's seat. The switch panel assembly is recessed into the left side of the flight engineer's table and is protected by a flush-mounted, hinged cover.

• **EAL—F. W. Lochner, general foreman,** said his company had tested a Sperry analyzer on one 749 Constellation with questionable results. He felt that the vibration harness was almost too much to maintain.

• **TCA—R. W. Farren, technical assistant** to director of engineering, pointed

out that his airline was buying BTH portable airborne analyzers to be used with Bendix equipment Since TCA does not carry flight engineers on any of its aircraft, Farren felt that an airborne installation was impractical He added that the analyzer is used at each stage of engine overhaul And he is keen to use it to troubleshoot aircraft heater circuits

▶ **Analyzer Users**—Most airlines use relatively experienced personnel to read their portable-airborne analyzers.

There is great logic to the use of well-qualified men. As a representative mentioned on the floor, analyzers are misnamed. The instruments do not analyze the goings-on within an engine—they merely portray what is occurring and the person observing the patterns and waveforms on the oscilloscope is the true analyzer of engine malfunction Generally the men used were A&Es with five years' aircraft experience, flight line lead mechanics or electrical maintenance men.

Continental Air Lines puts line electrical personnel on the analyzer When possible, CAL tries to analyze all flights originating at its main base in Denver prior to departure

Farren of TCA took exception to the view that only specialists be qualified to use the instruments He said that he wants to think of it as "every man's tool."

Paul Kovac, American Airlines' senior ignition engineer, commented that most of the airlines were in their infancy as far as the use of analyzers were concerned Therefore, it was only natural to select lead men to use the new device. He speculated that as time goes by requirements for use of the analyzer might be lowered, maybe not He pointed out that it is still the lead mechanic who runs up a $1 million airplane

To summarize, consensus of opinion is that some experience is required to use the analyzer successfully Specialists and lead mechanics generally operate the instruments, with the trend towards specialists

▶ **When to Use?**—American Airlines will use the portable-airborne Scintilla analyzer for ground check, test flight and troubleshooting, according to **Marvin Whitlock, AA assistant vice president, overhaul and supply** Other uses will be for engine test cell work and after number 1, 2 and 3 inspection checks

TCA will supply its originating stations with portable-airborne analyzers Farren pointed out that because most ignition malfunctions have incipient periods, a strictly line station does not need an analyzer Ten-hr intervals are suitable to detect troubles before they become too serious

J. E. Connor, maintenance technician (ignition), Hq. AMC, indicated

that the USAF found the analyzer particularly useful on postflight runups to analyze trouble reported during the preceding flight. They also use it during preflight checks prior to long hops (over ten hours).

▶ **Airborne Comments**—Airborne analyzer users had this to say:

Captain W. J. McFadden, USAF, made the comment that analyzers can finger engine malfunctions that no other instruments can detect. On flights lasting over ten hours, USAF practice is to run an analysis every two hours; on shorter hops, every hour. USAF also makes a quick surveillance during power run prior to takeoff.

PAA's R. K. Hart reaffirmed the usefulness of an analyzer as a postflight tool to check flight engineers' reports. He stressed the instrument's value in facilitating on-time departures. PanAm keeps the analyzer on at all times during ground runup, takeoff, climb, cruise and descent. A survey is made every 30 min. during flights. Hart said that the unit was difficult to use during takeoff because the flight engineer "doesn't have enough hands or eyes." The instrument is used whenever required to trouble shoot.

NWA's procedure is simple. Use the analyzer from takeoff to landing at the flight engineer's discretion.

TWA expressed the opinion that to run up an engine on the ground for a recheck was a waste of time; the instrument should be accurate enough to pinpoint the trouble in the air and allow the ground crews to proceed with correction immediately without further runup.

▶ **Where to Use**—The conference discussed the contribution analyzers could make in various operations.

• **Ignition Overhaul Shop.** Use of analyzers in ignition shops results in much better units being sent to test cells and saves considerable test cell time according to USAF. This program is being pursued vigorously.

TWA has analyzers at ignition shops and test cells, both. It has established good correlation between both establishments. A pressure bomb is used during the magneto bench check. This gives a close approximation to an engine pattern, but does not duplicate it exactly, says Parmet. He added that TWA soon expected to obtain improved results on engines running on the line.

TCA uses the analyzer in the accessory servicing shop. Farzen underlined its utility by saying that in its first month of operation, it picked up five incipient magneto failures—the equivalent of eliminating five delays, as he put it.

• **Engine Test Cell.** W. E. Brown, Pratt & Whitney Aircraft division, told the conference that P&WA use analyzers constantly during cell testing. He said it tells the engine's condition when running, where and what troubles are, if they exist, and will consistently show up incipient failures. He concluded that the analyzer has saved a lot of test cell time.

AA, using both Sperry and Scintilla analyzers in its test cells, averred that "no known case of ignition trouble has not been found."

Northeast has had marked success with test cell analyzers, the airline said.

• **Spark Plug Shop.** Scintilla analyzers have been used with success for research and development of new spark plugs, according to **H. P. Stanley of A. C. Spark Plug division.** It allows you to study breakdown patterns and other phenomena which could not be studied in any other way, he reported, adding that AC was well pleased with the instrument's performance.

▶ **Pros & Cons**—Relative merits of the three general types of analyzers were discussed fully at the meeting.

• **Portable analyzers**—EAL expressed the opinion that portable analyzers were not practical for a scheduled airline because their use required too much time.

PanAm seconded this opinion. It has both a Scintilla and Sperry portable unit at its Miami Overhaul Base. But mechanics will not take the 1-1½ hr. to hook up the analyzers, although they may end up by spending much more time troubleshooting the engine by more conventional means.

United concurred, but injected the thought that the portable analyzer was useful in solving unusual problems which defied standard procedures.

USAF took a different stand. Confronted with operating a large diversity of aircraft, some equipped with airborne analyzers, some portable-airborne and some not equipped at all, the service thinks portable analyzers have a definite use.

USAF said that it is contemplating spotting two portable analyzers with trained crews at each base as a start to cover aircraft having no disposition for

analyzers. The allocation can be altered to suit requirements as experience dictates. The USAF representative revealed that Scintilla has been requested to develop a kit to make the portable analyzer adaptable to every type of aircraft the USAF operates.

• **Portable Airborne Analyzers** — AA's Kovac gave a succinct summary of the pros and cons of portable airborne equipment.

Pros: Small weight increase per aircraft.

Lower analyzer investment compared to airborne.

Eliminates possibility of flight crews giving ground crews erroneous information.

Fewer men to train as analyzer specialists, with corresponding money savings.

Space- and weight-saving in the aircraft compared to airborne installation.

Speedy attachment of analyzer when needed gives considerable time saving over portable version.

Cons: Flight engineers in four-engine aircraft cannot determine trouble on the spot, especially when they develop at high altitudes. Special test flights are required.

Flight delays are greater than with airborne since a rerun is required.

Takes longer to become familiar with all wave forms on the oscilloscope; "practice makes perfect, perfect."

Rough handling to which the PA analyzer will inevitably be subjected, being hauled in and out of aircraft, may damage the unit.

Initial cost was a factor influencing United's thinking on PA vs. airborne instruments. To fill UAL's needs, 15 to 30 PA units will suffice, whereas over 100 airborne analyzers would be required. But the airline said it has an open mind and would probably decide within the next two years whether to go to a portable-airborne or straight airborne configuration.

▶ **Airborne Analyzers**—PanAm's representative cites several advantages for the airborne unit.

A big point is the time saved at through stations when the flight engineer, having pinpointed trouble in flight, can tell the ground crew exactly what plugs to change, for instance. Engine malfunction can often be cleared while plane is being fueled without time-consuming engine runup resulting in a no-delay or minimum-delay departure.

Airborne ignition analyzers' detective work is not restricted to picking up ignition troubles. At least two mechanical failures were cited by PAA as readable on an ignition analyzer in flight—piston ring or piston ring land failures and exhause valve failures.

In many instances such failures were detected soon enough to permit the pilot to feather the propeller before extensive damage resulted. So one cylinder was changed instead of the entire engine. Speed of trouble detection is another important attribute of the instrument.

Ignition Analyzer Switch Panel

Synchronizing Breaker Assembly

Another advantage not often cited for the airborne unit is that it permits an airline to make efficient use of a highly trained flight engineer's time during long flights.

National Airlines stated simply that it favored airborne analyzers because it was interested in reducing turnaround time and increasing aircraft utilization.

▶ **How Many Analyzers?**—Various airlines stated their requirements for portable-airborne analyzers at ground stations.

• American said the number would be predicated on the stations that had personnel qualified to use the equipment and on the number of schedules through or originating at the station.

• **United** is spotting one each at five major domestic stations and Honolulu. It added that the minimum commitment would probably be more than one unit per station and that the number of stations most likely would be increased.

• **Continental**, a smaller airline, uses the analyzer only at its main overhaul base. Initially, engines were analyzed every 50 hr., now every 25, with excellent results according to the carrier.

• **Trans-Canada**, with 45 stations, has planned to start with 13 portable-airborne units. Three will be used for bench work, the balance will be alloted to key stations, primarily those from which flights originate. After a year's experience, TCA will reevaluate its needs.

• **TWA** is mainly interested in airborne analyzers at the moment, but has plans for future evaluation of the PA unit.

▶ **Analyzer Problems**—Airborne analyzers have contributed heavily towards reducing number of premature engine changes, according to PanAm. And on-time performance has been materially improved. But there are some problems associated with the airborne instruments, PAA says.

• **Flight engineers** wrote up any slight pattern variation when analyzers were first installed in the aircraft. Usually, the item was carried on to terminal station, provided standard engine instruments read normally. There has been a reduction in this excessive writeup practice since the flight engineers have become more familiar with the instrument.

• **Work** has occasionally been done on the wrong cylinder when the sine wave synchronizing generator was not properly tuned.

▶ **Plug Points**—Northwest quoted a 17% reduction in plugs used on its R4360's since Sperry analyzers were installed in its Boeing 377s.

In a debate as to whether analyzers could prolong spark plug life, PAA said that removing plugs "on condition" as indicated by the analyzer was a poor scheme because you are always changing a few plugs requiring constant removal and replacement of cowling, etc. But TWA believes that the instrument can prolong plug life in general.

USAF quoted these remarkable statistics. A comparison was made over a 60 day period between 23 aircraft with airborne analyzers and 22 without the instrument. Type of plane was not revealed. During the 60 days, the non-analyzer aircraft consumed 746 spark plugs, the analyzer-equipped planes were issued only 117.

▶ **Analyzers & Mag Check**—Analyzers

GERMAN VISITOR

Gerhard Holtje (second from right), leader of a group which will guide the maintenance, engineering and equipment program of the new Western German airline, inspects a Continental Air Lines' R2800 engine at the carrier's headquarters, Stapleton Field, Denver. On a four week tour of the U.S., Holtje's trip is sponsored by the Mutual Security Administration. With Holtje, l. to r., are Wayne Lydon, CAL superintendent of maintenance; Col. Harry Short, CAL vice president maintenance and engineering, and James Boyce, export manager, Lockheed Aircraft Corp.

will not supersede mag check, according to the USAF, but will assist it. USAF has, for instance, lowered its maximum allowable mag drop tolerance from 75 to 50 rpm on analyzer equipped planes.

PAA said that the analyzer did not affect its mag check, adding that the instrument is a good supplement to the procedure. The carrier feels that takeoff is an ideal time to watch analyzer patterns, but the flight engineer is too busy to do much about it. PanAm stated that its crews take action on events seen on the analyzer if they are clear-cut, not if the indication is questionable. TWA said you have to build up know how to use analyzers successfully. There is a problem of general acceptance of the instrument, which means that the airline is going to analyzer dictated preventative maintenance gradually.

▶**Analyzer Weight & Manhours**—Average time to install a Scintilla portable airborne or airborne analyzer was quoted at 50-60 manhours, after the initial prototype installation has been made. Weights average 20 lb. for the PAA and 45 lb. for the airborne configuration.

• KLM quoted a 700 manhour figure for first installation in a Model 749 Constellation.

• LASI took 505 manhours for an 049 Connie installation.

• Continental expended only 50 manhours installing its Scintilla portable airborne instruments, including fabrication time for assemblies.

Sperry airborne analyzers take about 200 manhours to install according to such airlines as NWA, PAA and TWA. Weight averages 45 lb. These initial installation times were cited:

• Northwest—400 manhours

• KLM—700 manhours

• TCA broke down the installation of its analyzers into seven stages. Each was accomplished at a regular aircraft check. Average time on 20 aircraft was 94 manhours per plane, weight of the portable airborne setup was 27 lb.

Farren asserted that Trans-Canada disagreed with Scintilla on one point. The airline uses two separate mag leads instead of the one recommended by Scintilla. Reason is to eliminate the long-shot possibility of losing all four engines in case of a short.

(A concluding article on the recent ignition and engine analyzer conference will be printed in our Aug. 11 issue.)

LOCKHEED B-47 SUBCONTRACT

These pilot and co-pilot control stands are the first delivered subcontract parts for the B-47 Stratojet bomber which will be built by Lockheed Aircraft Corp. at Marietta, Ga. Looking over the stands are J. W. Alsdorf (second from left), president of the Cory Corp., Chicago, the subcontractor, D. J. Haughton (second from right), vice president and general manager of Lockheed Marietta, C. H. Rohe (left), Lockheed, and Col. J. P. Walters, Air Force plant representative.

Is Kerosene Safer Than High Octane?

The tendency of some oilmen to tag kerosene as a "safe" fuel when comparing it to high octane aviation gas is deplored by a spokesman for a major oil company.

The difference between the two is that kerosene simply has its own special group of hazards, he tells AVIATION WEEK. And worst hazard of all, he says, is for oil experts to develop in aviation engineers a sense of complacency about the safety merits of kerosene.

The use of kerosene presents no excuse for relaxing precautions. In fact, in refueling operations it demands generally more careful handling, according to ground crew instructions given by this spokesman's company. The problems associated with kerosene "are different and somewhat more difficult in many cases," he maintains.

"Give kerosene a chance to behave at its worst in refueling operations or in a crash and you will find little to choose from between it and gasoline," he warns.

Some of the major points this spokesman makes:

• With a wider boiling point, kerosene is more dangerous in hot weather and is more apt than gasoline to give off flammable or explosive vapors. Points of great danger are tank vents and filler cap openings.

• Being a heavier fuel and causing more friction in flowing, kerosene presents greater problems of unloading static electricity at the nozzle, and great care in grounding has to be exercised.

• Vapors emitted by regular aviation gasoline normally are too rich in hot weather to be either flammable or explosive. Cold weather is the time to watch out for high octane gas, when vapors are lean and hungry for trouble.

Under certain controlled conditions, kerosene may not act as badly as high octane fuel, but in a crash there is no way of controlling those conditions and both fuels can be considered equally dangerous, he concludes.

F-47 Overhaul Goes to Temco

More than 200 Republic F-47 Thunderbolt fighters are slated for overhaul by Temco Aircraft Corp. at Hensley Field, Tex. The work is being done under USAF contract. Previously Temco had reworked a number of Thunderbolts for Nationalist China, Colombia and Venezuela, as well as for the Air Force. It is also overhauling USAF C-54s and C-47s for the Coast Guard at its Greenville, Tex., division.

NAA's Recipe for Cost Reduction

Design your product for simplicity, light weight and small size; then police your manufacturing processes.

To hold down aircraft production costs begin in the design stage to hold down complexity, weight and size, and to plan for producibility. Then police your manufacturing costs as you go on.

These are the basic factors in the formula used by North American Aviation, Inc., which has produced more airplanes than any other company in the world, virtually all of them under fixed price contracts where profit depended on cost control.

In a recent report to Lt Gen E W Rawlings, head of Air Materiel Command, North American outlined its company policies with examples of cost reduction it had been able to accomplish.

"To the extent permitted by quality and schedule requirements, the least expensive way of doing every job is always sought and chosen," the company reported. "Often a dramatic example of cost reduction can be found where a costly way of doing something is supplanted by a less expensive but equally effective way. The less dramatic and frequently unmeasurable savings inherent in the policy and practice of rigid economy are considered by North American to be more important in the total picture."

Cited by North American were specific steps taken in holding down costs in each of the following categories: engineering, tooling, direct factor labor, materials, and general and administrative expense.

These ranged from employe programs creating the character "Frugal McDougall" to symbolize the company's conservation campaign, to establishment of a design standards group of engineers whose primary objective is to reduce costs by design recommendations.

Here are some of the things the design standards group has promoted which resulted in economies:

• **Utilization** of such new production techniques as knurled-swaged rod end assemblies, less expensive and more suitable than any standard arrangements.

• **Relaxing** of tolerance requirements for skin flushness in zones not critically related to aerodynamic qualities, saving shop time and effort.

• **Fostering** designs using economical new forms and production methods, such as large extruded hinge attachment of assemblies, tapered sheet for skins, and large one piece parts such as grids. In some of these, reduced assembly costs tend to offset high detail fabrication costs.

Factory suggestions for production improvements are handled by a shop contact department, which evaluates them with the engineering design groups.

While North American has made a policy of recommending waiver requirements which appear to impose needless cost or performance penalties on a specific design, this often means overcoming a strong resistance, the company states. (Resistance presumably is on the part of the military.)

North American reports samples of cost reduction practices from all sections of its organization:

• **Packaging.** The Seeger Refrigerator Co was packaging fighter drop tanks for North American which it was producing under subcontract, at a cost of $59.64 a tank container. A new and equally effective but less expensive container was developed, it costs $33.95, making a direct saving of $25.69 for one container. Projected over 30,000 units on order at the time of the change, the total savings is large: $770,700.

• **Drawings.** Printing of engineering drawings is regarded as a major cost item, but this has been reduced by two means, changing to a cheaper blueprint paper and development of a new continuous negative blueprint camera which saves manhours and speeds production.

• **Production line.** A program to manufacture dies for hydraulic stretch presses on a production line basis was responsible for increasing the output of dies per manweek from 1.1 dies in 1948 to 1.9 dies in 1951. During 1951 the North American die makers produced 4,500 dies under this system. It is an illustration of North American's tool planning and production control, which is functionally organized by type of tool or by section of airplane for which the tool makes a part.

• **Curved jaws.** An improvement on the Hufford stretch presses, credited to North American's J. H. (Dutch) Kindelberger, chairman of the board, provides a set of curved jaws for holding the aircraft metal to be stretch formed. The arrangement saves 36 in. of metal per part formed and it is estimated that the value of material saved in a 200-ship frame contract is around $100,000.

• **Calibrator.** The old "by hand" method of calibrating fuel in a new airplane's tanks before its test flights has given way to an automatic fuel level calibrator. It does the job in 32 man hours for a bomber, as compared to 960 hr. by the old method. For a fighter it takes 4 hr. now as compared to 36 hr. which it took under the former method.

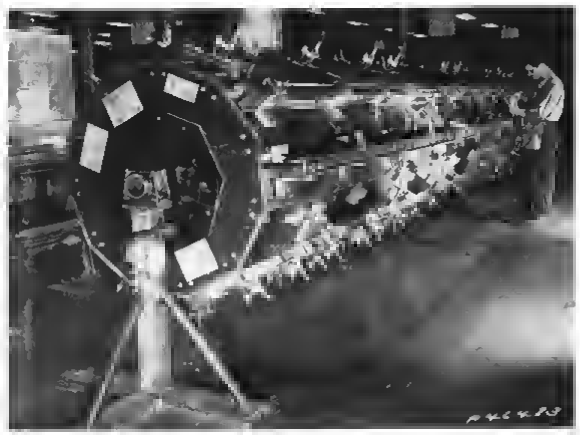
• **Purchasing.** Important savings on materials costs are credited to a North American practice of buying for an overall contract inventory, rather than a hand-to-mouth purchase for each individual contract. The pooled inventories system saves $150,000 annually on bushings alone, and an additional $27,000 is reported saved annually through quantity discounts on purchases of rivets.

Since establishment of North American in the Columbus, O., plant, combined requirements for both plants are being met by combined purchases where feasible. One example cited showed a savings of $245,000 through combining requirements of Los Angeles and Columbus plants for 14 purchase orders for materials for fighters.

▶ **Price Redetermination**—North American cites the use of price redetermination agreements with its suppliers as another important factor in cutting costs.

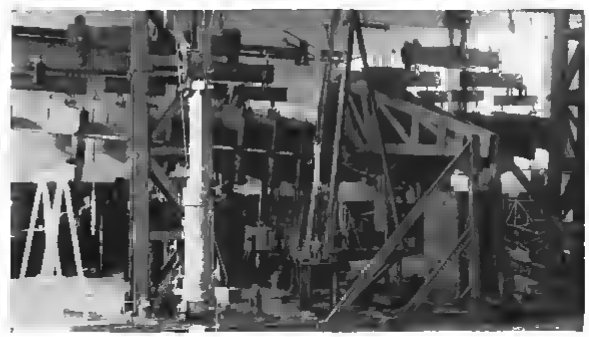
An example quoted showed that for one item, which was used in a quantity of 16 parts per ship on the F-86 fighter, the price was reduced from an original $30 each to $17 each. The price went down as the supplier's learning curve showed progressively greater efficiency in production.

Until the time the report was submitted to Lt Gen Rawlings, North American reported they had issued 75 purchase orders requiring price redetermination to 13 major equipment suppliers. —AMcS



MANY-SIDED TOOL

This unusual 11-sided check and drill fixture speeds production of parts for B-57A Canberra at Glenn L. Martin plant in Baltimore. Tool is made of Masonite. Its 28-ft. span provides firm base for clamps and blocks to hold stringers and other units rigidly in position, largely eliminating sagging experienced with conventional floor type fixtures. Mounted on a trunnion, fixture brings successive faces to comfortable working level, with two faces accessible at one time on each side.



ITALIAN STRUCTURAL TEST

Pictorial evidence of Italian aviation research comeback are the views above showing static test apparatus recently installed in Fiat's Turin plant. In these pictures the G 80 jet trainer is undergoing trials simulating a nose-down attitude. (The two-seater is powered by a de Havilland Goblin turbojet powerplant.)

Ford Orders Tools

Initial orders for machine tools have been placed by Ford Motor Co's Aircraft Engine division for production of Pratt & Whitney's J57 jet powerplant.

The engine will be produced in the same Chicago Cicero Avenue facility where Ford already is making P&W's R-4360 Wasp Major piston plant. Dollar volume to be subcontracted on Ford's jet program will total about 60% as against about 50% on the piston engine job.

Ford's plans include the erection of six new test cells scheduled for completion late in 1953.

PRODUCTION BRIEFING

▶ **Curtiss-Wright Corp.,** is closing its New Jersey plants, including Wright Aeronautical, Electronics and Propeller division for vacations from July 26 through August 10.

▶ **The Bellows Co.,** Akron, has received exclusive sales and distribution rights for Locke drilling and tapping unit in U. S. Canada.

▶ **Pan American World Airways,** Brownsville, Tex., will start overhaul of 2,400 USAF P&W R1830 engines on Sept. 1. It will complete its 1951 contract to rework 1,200 USAF engines Aug. 31, phasing this contract out at the rate of 160 powerplants monthly. Engines under the new order will be overhauled at the rate of 200 monthly.

▶ **Rohr Aircraft Corp.,** Chula Vista, Calif., is adding 45,000 sq. ft. of production space at its Chula Vista plant. The firm's new Riverside, Calif., facility will encompass 200,000 sq. ft. of manufacturing area, cost $2.5 million.

▶ **Skyline Products, Inc.,** Jamaica, N. Y., has completed initial unit of new plant in Deer Park, L. I., N. Y. The firm will utilize the new plant for defense and experimental work and the Jamaica unit for airline business.

▶ **Stop-Fire, Inc.,** Brooklyn, N. Y., fire extinguisher maker, has a contract from USAF for approximately 13,000 additional A-20 hand operated, portable extinguishers using CBM. New order totals approximately $155,000.

▶ **Thieblot Aircraft Co.,** has outgrown its Washington, D. C. quarters and moved to a new plant in Bethesda, Md., now employs about 100. Total floor space of the company is approximately 12,000 sq. ft.

USAF CONTRACTS

Following is a list of recent USAF contracts announced by Air Materiel Command

Accurate Parts Mfg. Co., 12405 Euclid Ave., Cleveland, clutch rebuilder machine $25,948

Acme Shear Works, Milwaukee, electric items, 34 ea., $25,330

Adel div., General Metals Corp., 10777 Van Owen St., Burbank Calif., pumps & valves, $349,828

Aircraft Hardware Mfg. div., 813 Edgewater Road, New York, bolts, 571,200 ea., $44,493

Alofs Mfg. Co., 345 32nd St., S. W., Grand Rapids, kits, $87,502

American Air Clay Co., 4717 W. 16th St., Indianapolis, kiln & kickwheel, $35,527

American Automatic Typewriter Co., Chicago, dryer—spare parts, $105,651

Arc Equipment Corp., Bryan, Ohio, oxygen regulator assy., $204,944

Barden Corp., Danbury, Conn., ball bearings, $155,599

Barr, W. M., and Co., 2328 South Lauderdale, Memphis, remover compound, 74,959 gal., $118,092

Beaumont & Crandall Inc., 2909 Walnut St., Kansas City, Mo., protective covers, 700 ea., $53,235

Bell Aircraft Corp., Helicopter div., Ft. Worth, kits, $30,114

Boston Auto Gauge Co., Pittsfield, Mass., fuel level gauges, $31,907; field gauges, $45,447.

Bower Roller Bearing Co., 3046 Hart Ave., Detroit, roller bearings, $739,459

Breeze Corp., Inc., 41 S. 6th St., Newark, N. J., adapter, 10,940 ea., $28,472

Buthsbaum, S., & Co., 1727 S. Michigan Ave., Chicago, paulins, $147,295.

Candaes, Inc., 527 S. Wells, Chicago, steel sheet, 999 tons, $83,928

Champion Spark Plug Co., 900 Upton Ave., Toledo, spark plugs, 191,400 ea., $332,592

Chandler-Evans div., Niles Bement Pond Co., Charter Oak Blvd., West Hartford, Conn., fuel pumps, $50,999

Cherry Rivet Co., 23 Winston St., Los Angeles, rivet, blind alum. alloy, 2,899,590 ea., $49,999

Chicago Pneumatic Tool Co., 6 E. Lanned St., Detroit, actuators & spare parts, $71,925

Cincinnati Milling & Grinding Machines, Inc., 4701 Marburg Ave., Cincinnati, grinder, 23 ea., $387,896

Clark Cable Corp., 11805 Berea Rd., Cleveland, chain assembly-roller, 1,205 ea., $67,324.

Collyer Insulated Wire Co., 249 Roosevelt Ave., Pawtucket, R. I., cable, $522,739

Columbia Machinery & Engr. Corp., 4th & High Sts., Hamilton, Ohio, shears, 10 ea., $245,906

Commercial Research Laboratories, Inc., 20 Bartlett Ave., Detroit, stand assembly, flowmeter, $32,234

Colon Corp., 545 Oliver St., Newark, N. J., leather, artificial, 90,719 yd., $162,679

Detecto Scales, Inc., Brooklyn, scales, 500 ea., $43,646

Deutsch Co., 7900 Avalon Blvd., Los Angeles, adapter, 543,425 ea., $172,799

DuPont de Nemours, E. I., & Co., Inc., Photo Products Dept., Wilmington, Del., paper, photographic, $92,559

Eastman Kodak Co., 343 State St., Rochester, N. Y., photographic chemicals, $29,402

Eastman, Samuel, Co., Inc., Concord, N. H., spare parts, $33,267

Eclipse-Pioneer div., Bendix Aviation Corp., Teterboro, N. J., generators, $479,490, valve assemblies, $107,369

Edisco, Thomas A., Inc., West Orange, N. J., fire detector parts, 19,190 ea., $74,915

Ellwood-Ivins Steel Tube Works, Inc., Oak Lane, Philadelphia, steel, 161,999 lb., $51,560

Everybodys Office Outfitters, Inc., 17-19 W. Fifth St., Dayton, office chairs, $37,181

Fairbanks Morse & Co., 600 South Michigan Ave., Chicago, scales, 200 ea., $27,270

Federal Motor Truck Co., Federal Ave., Detroit, spare parts, $98,209

Federal Telephone & Radio Corp., 100 Kingsland Road, Clifton, N. J., transformer rectifiers & spare parts, 214 ea., $80,080

Great Lakes Mfg. Corp., Hammond, Ind., plexiglass, $90,719

Hale Fire Pump Co., 706 Spring Mill Ave., Conshohocken, Pa., spare pump parts, $42,944

Hardie Mfg. Co., Hudson, Mich., spare parts, $43,528

Harnischfeger & McCune, Co. of North. ere Calif., 2979 Bryant St., San Francisco, punch, 60 ea., $27,171

Hoviland Products Co., 421 Ann St., N. W., Grand Rapids, compound, cleaning, 480,520 lb., $53,894

Hevi-Duty Electric Co., 4212 W. Highland Blvd., Milwaukee, regulators, 177 ea., $115,218; regulators, $159,942

Howard Steel Fabricating Corp., First Federal Bldg., Kokomo, Ind., cold rolled steel, 767,900 lb., $81,892; galv. steel sheet, 999 tons, $149,902

Hoot, Philip A., Co., Palisades Park, N. J., chemicals, $30,133

Hycon Mfg. Co., 2961 E. Colorado St., Pasadena, camera, $165,000

Huck & Heintz Inc., Cleveland, spare parts, $91,900; single phase inverters, 285 ea., $158,235.

LeBlond Machine Tool Co., Cincinnati, tool room lathe, 76 ea., $521,759

Lewis Engineering Co., 329 Church St., Naugatuck, Conn., bulb, temperature, 3,289 ea., $23,574

Lisk Aviation, Inc., Binghamton, N. Y., spare parts, $33,429

Lockheed Aircraft Corp., Burbank, Calif., kits, $40,400

Manufacturers Representatives Inc., 4250 W. Roosevelt Rd., Chicago, steel wire, $42,739

Monroe, J. A., Inc., 97-01 51st St., Long Island City, N. Y., camera, $33,414

Mercury Trading Corp., 137 E. McMicken Ave., Cincinnati, radio equipment, $29,181

Michigan Seamless Tube Co., South Lyon, Mich., chrome nickel steel, 218,432 lb., $70,504.

Millipiy Display Fix. Co., 913 N. Tenth St., St. Louis, floor stand displayer, 3,900 ea., $156,645

Monk Machine & Tool Co., Fort Huron, Mich., saws, 79 ea., $76,175

Moran Paint Co., Kiser and Lee Sts., Dayton, paint remover, 125,027 gal., $103,105

New Departure div., General Motors Corp., Bristol, Conn., ball bearings, $285,311

New York Air Brake Co., 420 Lexington Ave., N. Y., spare parts, $50,217

Nichols, W. H., Co., 48 Wesrd Ave., Waltham, Mass., pump spare parts, $23,991

Ohio Valley Slate, 1936 Westwood Ave., Cincinnati, portable blackboards, $50,280

Pioneer Parachute Co., Inc., 169 Forest St., Manchester, Conn., parachute assembly, $40,354.

Q O-S Corp., 38 W. 60th St., New York, focalscope camera, 142 ea., $58,510

Radio Corp. of America, RCA-Victor div., Camden, N. J., radio set, $2,069,999

Randall Mfg. Co., Inc., New York, electric oven, 101 ea., $32,885

Reliance Mfg. Co., 212 W. Monroe St., Chicago, kits, extraction, $71,405

Republic Aviation Corp., Farmingdale, L. I., N. Y., trainers, $48,905

Richardson, G. D., Mfg. Co., 400 Jefferson St., Ft. Collins, Colo., paulins, $197,512

Robbins & Myers, Inc., Springfield, Ohio, wrench, 43 ea., $41,867

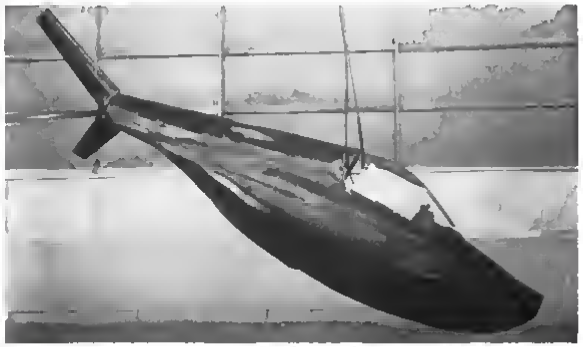
Robinson Aviation, Inc., Teterboro Air Terminal, Teterboro, N. J., Mount-Robinson model, $42,595

Rogers Industries, Inc., 43-49 Bleecker St., New York, amplifier and spare parts, 2,119 ea., $54,707

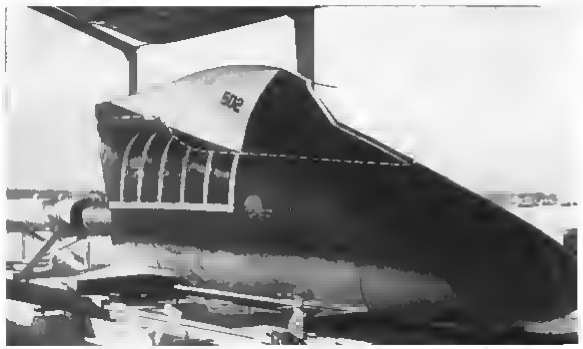
Safeway Steel Products, Inc., 5229 State St., Milwaukee, engine hoist, 43 ea., $50,131

Scintilla Magneto div., Bendix Aviation Corp., Sidney, N. Y., spare parts, $195,795

Skyline Clothing Corp., 424 Central Ave., Peekskill, N. Y., flying trousers, 21,423 pr., $417,259



THREE FINS open at aft end to stabilize flight of high flying escape capsule.



ESCAPE CAPSULE sits in what looks like F4D nose section for aeroballistic test.

New Capsule for Highspeed Bailout

The Navy Bureau of Aeronautics has a new pilot protection aid ready for use—a cockpit capsule for emergency bailout at supersonic speeds.

Developed at Douglas Aircraft Co.'s El Segundo plant, this aerial shed is expelled clear of the speeding plane by a rocket charge, and three fins at the aft end of the unit unfold for stabilization. The capsule first pops a small chute to slow forward speed, then at safe speed a main chute opens for suitable rate of descent. As the chutes unfold, deceleration from 1,100 to 300 fps. occurs in about 5 sec.

▶ **All Facilities**—Capsule is sealed and pressurized to protect against atmospheric conditions existing above 50,000 ft. It is insulated, and for a water landing floats upright, the plane's storage battery serving as a "weighted keel." Fresh air is fed in by wave motion. The capsule also houses survival gear similar to that carried by Navy life rafts.

▶ **Tests**—BuAer and Douglas conducted rough water flotation tests at Long Beach, Calif. The capsule was dropped from a crane for a 25-ft./sec. speed into the water to simulate the chute drop and floated successfully for an extended period. A Douglas engineer, in the cockpit during the test, said the experience was not uncomfortable.

In a static trajectory observation test, the capsule was catapulted by rockets from rest and reached 105 ft. before dropping to a net.

To determine if the capsule could be ejected satisfactorily at sonic speed near sea level, trial runs were made on the 10,000-ft. aero-ballistic track at the Inyokern Naval Ordnance Test Station, with the capsule fitted to a test rig simulating the forward part of a fighter plane.

Two successive stages of rocket propulsion (100,000 lb. thrust each) sped the unit down the track at a near-760 mph. clip. After traversing several thousand feet, the capsule was ejected and the fins stabilized the unit's let down.

Navy officials are reported to have said that principles used in the development of the capsule can be applied advantageously to all aircraft cockpits. Standard instruments in the cockpit capsule were arranged more compactly, radio and controls were smaller, and total number of instruments were reduced.

Resemblance of the capsule cockpit to the nose end of the new Douglas F4D Skyray triangular wing fighter, indicates that one use of the new development may be for that plane.

Engine Computer

A circular slidерule computer for flight solution of piston and jet powerplant performance problems is being distributed by Consolidated Vultee Aircraft Corp. service representatives to B-36 flight crew members.

The computers carry movable, logarithmically divided scales to help in the determination of such factors as horsepower output, prop shaft torque and pounds of fuel consumed at any given altitude, temperature and speed.

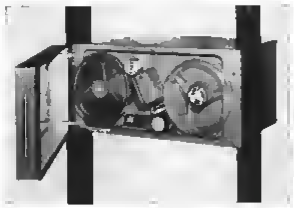
One side of the computer—a three disk, 8-in.-diameter unit—has scales for computation of density altitude and air speed.

Scale values were accumulated from B-36 flight data and applied to the circular slidерule principle. Convair's field service representative Mel Clause designed the computer, which was produced by the company's service engineering department at Ft. Worth. Clause has put in more than 1,000 hr. flying time in B-36 test trials.

Wright Expands

A recently completed one-story building on a five-acre plot has been leased by Wright Aeronautical division in Hackensack, N. J., for production of engine cylinder heads. Transfer of machinery and personnel to the new facility has started and will be completed by mid-summer. Areas at the Wood-Ridge plant released by movement into the Hackensack factory will be used for expanding manufacturing and inspection processes.

Hi-Fi Recorder Seen as Test Tool



A newly developed extremely high-fidelity tape recorder, capable of recording signal frequencies between 200 and 100,000 cycles/second, should prove a handy addition to the flight test instrumentation engineer's existing tools. This hi-fi unit, produced by Ampex Electric Co., can record high-frequency flutter, vibration, or transient phenomena which previously had to be obtained with a cathode-ray oscilloscope equipped with a moving film camera.

The Model S-3079 recorder is essentially a stripped-down airborne version of Ampex's ground-based Model 307 which was designed for FM/FM telemetering of aircraft and guided missile data. Although the playback and erase features have been left off the airborne version, it retains the Model 307's high-fidelity recording capabilities. The S-3079 has a single recording head, thus providing only one information track on ¼-in. tape.

The new airborne recorder meets the frequency band standards (350 to 80,000 cps.) established by the Research and Development Board. This wide band permits telemetering and recording of 14 or more channels of data transmission using frequency modulation of the carrier frequency (FM/FM). FM/FM telemetering makes the data transmission less susceptible to "static" or interference.

The airborne recording has two recording tape speeds: 30 in./sec. and 60 in./sec. The slow speed provides 7 min. of usable recording time, the fast speed provides 3 min.

►**Frequency Response**—According to Ampex, the recorder response is flat within in ±3db between 400 and 80,000 cps. at the 60 in./sec. tape speed; at slow speed the same linearity is obtained between 400 and 40,000 cps. This fidelity is obtainable if the tape is played back on the Ampex Model 307 ground-based unit.

Full recording level is produced by a 1-volt signal feeding into a 100,000-ohms recorder input impedance. This operating level provides a maximum of 1% total harmonic distortion as measured at any frequency in the pass band, according to Ampex. Tape saturation occurs approximately 20db above the recommended operating level.

►**Tape Drive**—An essentially constant tape speed is required for high-fidelity recorder performance. Because aircraft inverters have a wide permissable frequency variation in the voltage they supply, Ampex generates its own constant frequency a.c. within the recorder to power the capstan motor which drives the tape.

This is generated by a 60-cycle tuning fork and associated oscillator-amplifier. Using this a.c. power source for the capstan motor, and a high inertia tape-drive system, Ampex says the recorder will hold tape speed constant within 0.2%. The high inertia drive system requires about 20 sec. to come up to "synchronous" speed, which explains why the fast-tape speed mode of operation gives not half, but slightly less than half, the useable recording time of the slow-speed mode. However, the tape comes up to within 1% of its correct speed in considerably less time.

►**Weight and Size**—The Ampex unit weighs about 40 lb. and is remotely located if desired. The recorder is designed for rack mounting. Its size is approximately 8¾ in. high by approximately 16 in. deep.

The recorder requires both 28v d.c. and 115v. a.c. power. Approximately 2 amp. of d.c. and 1½ amp. a.c. are normally required.

Ampex Electric Co., 934 Charter St., Redwood City, Calif.

Avionic Consultant Group Organized

Leonard Katz, who directed the Raytheon Mfg. Co. project which developed the new turbulent air flow process for cooling avionic equipment, is now head of Woburn Engineering Co., a newly formed consulting engineering firm.

Woburn will specialize in heat transfer, mass transfer, electronics, mechanics, process control, and automatic manufacturing methods.

Woburn Engineering Co., 19 Ward St., Woburn, Mass.

NEW AVIATION PRODUCTS

Jet Work Speeded

A new drilling machine which is claimed to cut down rejects and speed up production of jet engine parts has been developed by the New Britain Machine Co., New Britain, Conn.

The equipment is designed for circular pattern drilling of flanges on jet engine shrouds, vane support rings and the like. It has great flexibility, utilizing several adjustable drilling heads, and does away with expensive drill jigs and fixtures, the firm says. Operator indexes work to successive positions and pushes a "feed" button to start each stroke, otherwise operation is automatic.

The machine is designed to prevent, among other things, the distortion of flanges on the jet assemblies while they are being drilled. These are thin gage but usually of hard metals such as stainless steel and titanium.

Accelerometer

An accelerometer for airplanes and guided missiles, which senses acceleration with its own seismic system, then translates this into electrical output that varies linearly with the speed changes, has been developed by Wiancko Engineering Co.

The unit is built to meet exacting requirements of control systems as detailed in AN-E-19 and weighs little more than 2 lb. It covers a range from 0.5G to 25G, but this can be extended.

The unit can be divided for purposes of description into two parts—the mechanical and electrical. The mechanical element, the seismic part, is completely independent of the electrical, with exception of magnetic flux. It consists of mass, spring and armature assembly. Movement of the armature—controlled by acceleration imposed on the system—varies the reluctance of a bridge of four active arms excited by a 400c source such as a standard aircraft inverter.

Resolution is claimed to be extremely high and hysteresis very low as a result of the separation of mechanical and electrical systems in the unit. And signal to noise ratio also is very good because of high output voltage and complete absence of sliding contacts, Wiancko says.

Mechanical damping can be adjusted to the value desired by changing the temperature of a silicone fluid within the unit. This is done by means of built-in thermostat and heater operated by the aircraft's 28v d.c. electrical supply.

Wiancko Engineering Co., 255 N. Halstead St., Pasadena 8, Calif.

How to Design an Airfreight Carton

The time and engineering that must go into even a simple airfreight box is illustrated by the new carton Gaylord Container Corp. has built for United Air Lines to ship cut flowers in.

The box is sturdier than previous types, Gaylord says, has lengthwise corrugations to give maximum longitudinal rigidity. Solid fiber cleats midway in the body of the container keep flower stems in place, add to vertical stability and reinforce the center of the lid.

The container was tested in procedures similar to those followed in testing other aircraft equipment, including prototype and service flight trials.

United began research on the box several years ago. The data it compiled was handed over to package manufacturers, and the top design turned out to be the Gaylord version.

The technique of refrigerating the boxes is a novel one. Ice blocks are made of newspapers saturated with water and frozen. This method keeps the boxes relatively dry in transit and largely eliminates the possibility of breakage from sogginess, according to United.

Gaylord Container Corp., 111 North Fourth St., St. Louis 2, Mo.

Smallplane Radio

A battery-powered radio, developed by Mitchell Industries, Inc., is the latest entry in the highly competitive smallplane communications field. It is the only one of its type, says the firm.

The radio, Airboy Sr., can stand by as a self-powered emergency set in those craft already equipped with radio. And it can be used in planes without radio to fill routine transmission and reception needs. It works on a 25½ ft. whip antenna, or VHF antenna if that already is installed in the plane.

Power for Airboy Sr. is provided by two flashlight and two "B" batteries. Short-wave voice signals can be sent 75 mi., says Mitchell. The set can be placed anywhere with new type brackets or simply rested at the most convenient spot. A converter permits it to use outside power if that is desired. Three crystal-controlled channels are provided, two optional, for emergency and tower frequencies. The set weighs 5½ lb., has a loudspeaker and is priced at $99.50 before tax.

Mitchell Industries, Inc., P. O. Box 17, Mineral Wells, Tex.

FINANCIAL

Air Travel Deposits & Unearned Revenues

DOMESTIC TRUNKLINES—AT DEC. 31, 1951

CARRIER	AIR TRAVEL PLAN DEPOSITS	UNEARNED TRANSPORTATION REVENUES
American	$ 6,032,875	$ 3,065,167
Braniff	351,475	306,454
Capital	478,975	216 398
Chicago & Southern	210,800	179,769
Colonial	31,105	128,169
Continental	None	72 215
Delta	167,875	338,191
Eastern	2,457,350	1,050,139
Mid-Continent	65,450	182,776
National	79,900	330,829
Northeast	None	128,162
Northwest	578,425	863 826
TWA	1,838,076	6,934,130
United	3,811,571	2,959,104
Western	209,950	304,748
TOTAL	$16,313,827	$17,060,077

SOURCE: Annual reports

Fly-Now-Pay-Later Plan Grows

It's convenient for travelers, but perhaps even more convenient to carriers as source of working capital.

Air travel credit cards are playing an increasing role in promoting passenger traffic gains among the scheduled air carriers. A recent survey reveals that between 20% and 25% of the airline industry's 1951 gross business was transacted under this charge account arrangement.

But what is not generally appreciated is that a considerable amount of working capital has also been generated from this source.

It is called the Universal Air Travel Plan agreement. Some 67 airlines throughout the world participate, but the U.S. airlines contribute the bulk of activity under the charge setup.

▶**Convenient Card**—Air travel credit cards are a great convenience to businessmen doing considerable flying. The carrying of large sums of cash to pay for transportation is avoided. To obtain a credit card it is necessary to deposit $425 with an airline which is party to the Universal Air Travel Plan agreement. A credit investigation also establishes the financial responsibility of the applicant for a card. Once credit is extended on this basis, a card holder may buy a ticket on any scheduled airline to any destination desired. The only limitations are that a North American card limits charges to carriers in the region indicated while an International card is worldwide.

▶**Use Rising**—In all, about 50,000 firms hold card authorizations in the Universal Air Travel Plan, with an average of about ten cards per firm. There were more new subscriptions for the plan in 1951 than in any of its previous 15 years of existence. The Big Four alone (American, Eastern, TWA and United) are reported to have sold about 6,000 cards last year.

The use of these credit cards has also simplified the detail for accounting and treasury departments which formerly had to keep many individual travel records and advance cash to individuals making trips. The utility of these cards has also been broadened considerably in recent years. The two largest car rental companies have been honoring air travel cards for credit. Moreover, hotel chains and other organizations have also accorded the charge privileges to airline cards.

▶**Capital Source**—While the airline credit card is becoming more of a sales instrument, it was not always so. There is strong reason to believe that at the

outset of this plan the "deposits" were urgently required as a source of working capital to many airlines. Funds obtained in this manner are interest-free and bulk very importantly in the operations of an airline. While the need for this particular type of capital is less urgent today than it was at the outset, funds from this source continue to represent a substantial element of support to current airline operations.

An exclusive AVIATION WEEK survey reveals in the accompanying table the amount of air travel plan deposits for the individual domestic trunk airlines at the 1951 year-end.

It can be seen that the total for the group aggregates more than $16.3 million. The industry had a net working capital of about $68.4 million at Dec. 31, 1951. This indicates that 24% of this amount is represented by the "deposits" of the air travel plan.

Of course, the relative importance of this source of funds varies among the separate airlines.

• Eastern, for example, with a net working capital of $25.1 million, has less than 10% of this balance contributed by the air travel credit deposits.

■ Braniff, on the other hand, with a net working capital of $827,000, finds almost 43% of this amount contributed by the air travel plan.

▶ **"Unearned Revenues"**—Another major source of capital, but peculiar to all forms of transportation, is derived from "unearned transportation revenues." This represents advance bookings, unused return portion of round-trips, and other similar forms of services sold but to be fulfilled at a later date. In effect, this becomes a revolving source of funds contributed on a continuing basis.

The aggregate unearned transportation revenues total some 25% of the group's net working capital. Together with the funds obtained from the air travel plan cards, this means that almost half of the industry's net working capital is derived on an interest-free basis from these floating funds.

▶ **Vital Contributions**—Variations appear in the relative importance of unearned transportation revenues in their contribution to working capital balances of the separate carriers. But taken together, air travel deposits and unearned transportation revenues are vital to some carriers—their removal can become outright critical for a number of the airlines.

For example, TWA, without allowance for the recent mail rate reduction for its international services, showed a net working capital of about $4.2 million at the 1951 year-end. The air travel deposits and unearned revenues totaled almost $8.8 million, or more than twice its net working capital. This indicates the vulnerability of the carrier to any sudden shifts in funds obtained from these sources. Interestingly enough, a number of years ago when TWA was hit by the pilots' strike it lost more than $3 million in cash as redemptions were made for advance bookings.

▶ **Credit or Liability?**—As an interesting sidelight, until the first of this year the Civil Aeronautics Board, in its System of Uniform Accounts specified that unearned transportation revenues should be handled as a deferred credit and not as a current liability.

Nevertheless, such carriers as Capital and Eastern pursued a sound accounting practice of showing this item as a current liability. The CAB recently recognized the realistic nature of this item and specified that starting with January 1, 1952 all carriers will show it as a current liability.

The air travel credit card may find much wider application and can unquestionably develop considerably more traffic for the industry in view of the inherent advantages it affords. At the same time, the reliance of the industry on funds obtained from this channel as well as from unearned revenues points up the need of the separate carriers to build up a stronger base of permanent capital having a far more dependable base.

—Selig Altschul

Five Airlines Reported Interested in C-97

- **Boeing could produce 25 on present military line.**
- **Certification work will start with firm orders.**

By Alexander McSurely

Seattle—Boeing Airplane Co is endeavoring to get back into the commercial transport field with plans to make as many as 25 of its C-97s available to airlines at about $1.2 million each on an attractive time schedule. At least three airlines and two air freight carriers have expressed interest.

Airplanes to be sold would be C-97Fs, taken right off the high volume military production line at the Renton plant, Seattle. Success of the plan depends largely on how Boeing can work out with the CAA Office of Aviation Safety the details of certification of this model for civil use.

▶ **Carrier Interest**—Airlines reported interested in the program include companies now using Boeing Stratocruisers Northwest, Pan American and British Overseas Airways, and Slick Airways and Flying Tigers which would use the basic freighter configuration.

Boeing wants to sell the airplane on an "as is" military basis, minus the tail boom refueling system and special gas tanks which each military model carries. Preliminary conferences with CAA indicate that certification of the military model probably will cost about $500,000.

Plans are for Boeing to do the necessary certification work as soon as some firm orders are pinned down. The certification program, it was learned, is one factor holding back launching an active sales campaign for the airplane. Boeing officials have not forgotten the long involved and expensive certification program carried out on the Stratocruiser, and especially CAA requirement for spoilers on the Stratocruiser wing. The spoilers are about to be removed.

▶ **More Expense**—This has resulted in another expensive flight test program. A Pan American Stratocruiser is being used to provide the necessary documentation required by CAA to prove what pilots and the airlines operating the plane have been contending on the basis of flight experience. That the spoilers are to "correct a pitching characteristic arising in a steeply vertical attitude in which no pilot is ever going to put the big double-deck airplane voluntarily", and that the spoilers seriously deteriorate takeoff and landing characteristics of the airplane, making necessary higher speeds at both conditions.

The C-97 sales program would require that customers do their own interiors. Pan American World Airways had some experience doing the interior of one Stratocruiser in its shops and it was considered a first class job.

And for customers who do not have sufficient shop space to do their own interior fittings, it is pointed out that there are large aircraft service companies, such as Grand Central, Southwest Airmotive, Pacific Airmotive, Temco and others, who make a business of refitting large military airplanes with plush interiors.

One feature of the basic KC-97F model which would make it an improvement over the original Stratocruiser is its use of an improved version of the Pratt & Whitney Wasp Major engine, the R4360-75. Improvements include redesigned cylinders, crank case and shaft, a new exhaust manifold system and improved ignition system.

▶ **Space Available**—Presumably it provides the additional cruising power which Boeing always has wanted from the Wasp Major.

Boeing's ability to divert some of the C-97s to civilian use results from additional production capacity made possible by two factors: Slow-down of USAF schedule for the planes and the rise in the production efficiency curve at Renton.

Relatively low manufacturing costs for the big carrier make it possible for Boeing to sell the C-97Fs for approximately the price which was charged for the original completed Stratocruisers, despite major intervening increases in manufacturing costs.

Boeing's ability to deliver in the relatively near future, as soon as CAA certification red tape is cleared away, promises to ease the tight market for four-engined transports. The two principal American big transport producers, Douglas and Lockheed, are booked solid for several years.

The market is expected to absorb whatever Boeing can deliver from its military production, since the upward trend in demand for passenger and cargo air transports is continuing.

BOEING C-97 may get into commercial field. Some airlines are reported interested in buying military planes off assembly line, finishing interiors themselves.

Low Flying Problem Temporarily Settled

Washington National Airport's city ordinance problem with nearby Alexandria, Va., which last year banned flying under 1,000 ft. over the city, is temporarily settled. City Councilman Franklin P. Backus says a similar ordinance passed in Cedarhurst, L. I., was ruled unconstitutional in a federal court. Alexandria and others can't do anything unless the Court of Appeals reverses the lower court on the Cedarhurst case.

Larry Cates, Washington spokesman of the Air Line Pilots Assn., told Alexandria officials the city should have made an investigation a year ago, instead of passing an ordinance it could not enforce. CAA Deputy Administrator Fred Lee also has been participating in discussions with the city council for the past year.

Trouble is, as noted in the President's (Doolittle) Airport Commission report, the law is not clear on municipal and federal rights to control the air space and the buildings standing below it.

Mail Subsidies

- **CAB supplies figures on international carriers.**
- **And they could be potent weapon for critics.**

By F. Lee Moore

Civil Aeronautics Board has provided critics of airline subsidies new and potent ammunition in the form of an official breakdown showing just how much subsidy each U. S. international carrier is getting, industry sources say.

The CAB analysis shows that international subsidies this fiscal year amount to an estimated $46 million, of which $26 million goes to the far flung Pan American enterprise, $4.5 million to TWA, $3.5 million to Northwest, $2.5 million to Panagra, $2 million to Braniff, $2 million to Chicago & Southern, and the remaining $5.5 million to smaller international and territorial operations.

The Board came up with its analysis "Administrative Separation of Subsidy from Total Mail Payments," after several years of insistent congressional demand—particularly by the House and Senate Appropriations Committees.

►**On Schedule**—Congress wants the subsidy information to help draft a bill to make airline subsidy a separate appropriation from Post Office airmail. A year ago, Donald Nyrop, then the newly appointed CAB chairman, promised Congress a complete report of domestic subsidy by October and international by this month. The reports were finished on schedule but the international study was not released until the Universal Postal Union international airmail rate had been set.

Railroad, shipping and independent airline interests may try to use this ammunition in support of a stiff airmail subsidy appropriation bill in Congress next year. A bill separating all airline subsidy from Post Office airmail appropriations along the lines proposed in the CAB report could make the subsidized airlines a vulnerable target for a hatchet-minded Congress, regardless of the merits of adequate international airline operations and equipment purchase.

Once airline subsidies are being appropriated as a separate budget item, any cut may mean a less-than-fair return (8%) on investment for the stockholders. The threat of this is real, because more adverse publicity may attach to a straight subsidy bill than it has to the annual Post Office airmail appropriation, previously known only to contain "some" subsidy.

Mail Rates of Leading International Airlines

(Per Aircraft Seat Mile or Per Revenue Plane Mile)

	CAB–Proposed Rate (cents)	Present Effective Rate: Rate (cents)	Present Effective Rate: Date	1951 Yield (Calendar Year): Rate (cents)	1951 Yield (Calendar Year): Revenue Reported (000)
Braniff	———	65 6/MI	6–51	59.9/MI	$2,060
Northwest	———	1 76/ASM	1–51	1 69/ASM	3,800
Panagra	1 315/ASM	0 279/ASM	10–51	0 90/ASM	2,107
Pan American:					
Alaska Div.	(Final Rate)	1 612/ASM	7–52	0 786/ASM	1,036
Atlantic D.	———	1 90/ASM	4–52	1 47/ASM	13,686
Lat. Amer. D.	———	25 7/MI	1–49	25.49/MI	7,227
Pacific D.	(Final Rate)	2 32/ASM*	1–51	2 48/ASM	11,099
TWA	———	0 76/ASM	7–52	1 13/ASM	6,363**

* Before Korean Airlift adjustment.
** Gives effect to reduction in rate July 1, 1951

Subsidies

Route Area and Airline	1951	1952	1953
Trans-Atlantic, Europe, Africa and Middle East			
TWA	$4,240,000	$4,314,000	$4,497,000
PanAm	10,609,000	9,282,000	8,884,000
Latin America			
PanAm	5,435,000	8,082,000	8,034,000
Braniff	1,999,000	2,253,000	2,188,000
C & S	1,572,000	1,818,000	1,811,000
Panagra	2,243,000	1,947,000	2,351,000
Caribbean	248,000	204,000	202,000
Pacific, Far East			
PanAm	7,263,000	7,766,000	7,766,000
Northwest	2,997,000	3,034,000	3,734,000
Intra Hawaiian			
Hawaiian	30,000	459,000	462,000
TPA	19,000	211,000	209,000
States-Alaska			
Alaska	—	638,000	757,000
Pacific Northern	—	478,000	846,000
PanAm	792,000	901,000	1,397,000

►**Average Rate**—But the Board's carefully documented subsidy report also reveals that airlines aren't subsidized as much as many observers might believe.

The average international compensatory service mail rate is about 75 cents, the way CAB figures it. That is less than half the recently-reduced Universal Postal Union rate of $1.91 for most routes. Congress nearly passed a subsidy separation bill last session that would have called the UPU rate a "service rate."

The CAB study indicates that less than 15% of international and territorial airline operation is subsidized. CAB estimates that 13.7% of their fiscal 1952 revenues were subsidy, and next year it'll be 13.2%.

►**Airline Revenues**—Less than 20% of revenues are mail pay—including both subsidy and mail service, whereas back in 1938 the mail pay (virtually all subsidy) accounted for 56% of international airline revenues.

Proponents of the present fair-return-on-investment formula for subsidizing international airlines point to the almost complete independence of subsidy of domestic airlines as the result of their progress under the same formula. Some 79% of domestic airline operation is by the Big Four—American, Eastern, TWA and United. They are now operating on a 45-cent mail rate, which is pretty close to non-subsidy. They could get along without carrying any mail at all if they had to, according to CAB.

Now that an official air subsidy analysis is available, Congress will have a factual method of analysing each air mail appropriation. For instance, TWA's international operation is 9% subsidized, according to CAB figures. Congress has the option of cutting it below the rate yielding TWA a profit—with the risk of ending construction and operation of a large number of long-range Super Constellations. The same is true for Pan American's Atlantic division DC-6s, 13% subsidized, and for other Pan Am routes less developed than the Atlantic European system.

►**Congress now can see what it is getting with the present subsidy. And Post Office can now state with some degree of accuracy just how much of its air mail appropriation is for service performed, and how much for subsidizing the U. S. world air service network.**

CAB has set what it calls the "service rate per mail ton-mile" for carriage of international and territorial mail. The rate is scientifically projected from the domestic Big Four rate, which CAB was able to determine quite accurately because the Big Four lines are virtually or completely nonsubsidized.

CAB finds that the cost plus reasonable profit for hauling and priority handling of one ton of international and territorial mail for one mile averages out as follows for various route areas:

- **Trans-Atlantic, Europe, Africa and Middle East**—85 cents.
- **Latin America, PanAm**—59 cents. (PanAm routes include New York-Latin America, San Juan flights.)
- **Other Latin America Routes**—88 cents.
- **Caribbean**—$1.38.
- **Pacific, Far East**—67 cents.
- **Intra-Hawaiian**—81 cents.
- **States-Alaska**—47 cents.
- **Intra-Alaska**—$1.29 for large scale, $2.50 for smaller, bush-type operation.
- **Domestic route extensions**—45 cents to Mexico, San Juan and Hawaii; 53 cents to Cuba and 75 cents to Bermuda.

►**How CAB Computes It**—The total mail pay is set by the Board to yield an airline about 8% net profit (after income taxes) on its investment. In its administrative separation of subsidy out of that total mail pay, CAB has estimated the cost of hauling and handling the mail, added in a profit, and subtracted that "service rate" from the total. Thus, the subsidy estimate is the difference between the service rate and the total rate.

Here is how CAB computes the cost of hauling and handling the mail itself:

Subsidy Proportion of Total Revenues

Route Area and Airline	1951	1952	1953
Trans-Atlantic, Europe			
Africa and Mid East			
TWA	9.3%	9.2%*	8.9%
PanAm	16.4	13.9	12.5
Latin America			
PanAm	8.6	11.2	10.6
Braniff	29.1	24.6	19.8
C & S	40.3	42.0	38.9
Panagra	14.4	11.5	13.0
Caribbean	26.1	20.4	19.3
Pacific Far East			
PanAm	22.1	21.4	19.5
Northwest	19.0	16.4	17.0
Intra-Hawaiian			
Hawaiian	0.9	11.2	10.6
TPA	1.9	16.7	14.1
States-Alaska			
Alaska		14.8*	25.5*
Pacific Northern		14.8*	25.5*
PanAm	15.0	14.8	25.5

* Estimated

Source: CAB "Administrative separation of Subsidy from Total Mail Payments to U. S. International Overseas and Territorial Air Carriers"

the average ton-mile cost of the Big Four domestic airlines for moving almost anything and promoting traffic was found from airline reports to be about 34.2 cents a ton-mile. Adding cost of priority handling of the mail, and adding an 8% profit (after taxes), the Board originally came up with a service rate of about 42 cents, the airlines argued that was too low, and it was set officially at 45 cents.

The service rate for all carriers, domestic and international, then merely was projected from the Big Four's 45 cent rate, based on how much greater their overall costs were than those of the Big Four.

For example, PanAm Atlantic division costs in fiscal 1951 averaged 68.09 cents a ton-mile, exclusive of passenger extras. Comparable costs for TWA were 60.37 cents (PanAm Atlantic operates some thinly-traveled, high-cost routes to South Africa, thus raising costs over normal Atlantic and European routes).

Average cost of the two—PAA Atlantic and TWA—computes to 64.23 cents per revenue ton-mile. That is 187.81% of the Big Four's cost of 34.20 cents. Multiply 187.81% times the Big Four's 45-cent rate and you get about an 85-cent average service mail rate for PanAm and TWA. Although PanAm's cost is a bit higher than TWA's, the Board preferred to group carriers operating in the same general area with approximately the same type routes.

▶**The 1952 and 1953 Estimates**—The Board used final mail rates in projecting fiscal 1952 and 1953 mail pay, wherever final rates are set. Otherwise, the Board estimated the mail pay, based on current trends and CAB thinking about what it will do with each carrier's mail rate during the period.

Pilot Group Starts Move for New Union

A group of airline pilots early last week took initial steps toward making a clean break with Air Line Pilots Assn. and setting up of a new organization called the Air Transport Pilots Assn., under Clarence M. Sayen, who has been president of ALPA. The move was precipitated by return of former ALPA head David L. Behncke, who had obtained a court order reinstating him as leader of the organized pilots.

And in Danville, Ill., a group of pro-Sayen pilots appeared before U. S. Circuit Court of Appeals petitioning for a stay of the order granted Behncke and asking that an appeal be granted.

▶**Want New Setups**—But a Washington, D. C., spokesman for ALPA said that "regardless" whether a stay order "we can live with" is granted the pilots will go ahead and form a new group. The ALPA representative told AVIATION WEEK the pilots have received "expressions from all the major airlines" hoping that they can work out their affairs shortly. It was believed that a new association could be formed in a matter of weeks. In the meantime ALPA's Washington and Chicago staffs had resigned, although clerical employes stayed on the job at the pilots' request.

Air Line Pilots Assn. numbered almost 7,500 active pilots prior to the new development, plus some 2,500 inactive members. According to an ALPA spokesman less than 1% of active airline pilots are not organized.

CAB Proposes Mail Rates for 3 Lines

CAB has proposed final mail rates for three more domestic airlines—Mid-Continent, Robinson and Southwest. Here are the new effective rates and revenues predicted by CAB at the proposed base rates:

• **Mid-Continent.** The new effective mail rate anticipated by CAB for Mid-Continent is 18.65 cents a revenue plane mile, assuming a load factor of 55%. The sliding scale mail pay formula is set to yield MCA $1,877,000 mail pay annually at this rate; this would give an 8% return on investment.

If load factor drops to 54%, effective rate goes up to 22.63 cents a mile, but profit drops to 5.86%; load of 50% yields 26.63 cents rate but profit drops to 3.72%. If the load factor goes up to 62%, profit is figured at 10.13% on investment. Break-even load factor is figured at 48.3%.

This final rate schedule is effective starting Jan. 1, 1952. In addition, CAB has granted lump-sum final retroactive mail pay to Mid-Continent's overall system of $741,554 for the period Aug. 13, 1951, to the end of that year (effective rate 20.04 cents a mile) and another $89,738 to its feeder segment (no part of the total system) for Sept. 26, 1950, to Aug. 12, 1951 (effective rate 11.25 cents a mile).

• **Robinson.** CAB proposes a final effective rate of 49.21 cents a revenue plane mile, to yield $906,908 a year. That assumes a predicted 48% load factor. As the load may vary from that, earnings will go up or down from around 8% on investment. This rate is effective from Feb. 18 this year.

• **Southwest.** CAB proposes a final effective rate of 47.27 cents a revenue plane mile, to yield $1,152,782 a year. This assumes a 51% load factor. This rate is effective from last Feb. 1.

Franco-German Leaders Meet

(McGraw-Hill World News)

Paris—Former German aircraft industry leaders, led by Ernst Heinkel and Wilhelm Dornier, met here recently with top French plane makers for the first time since the end of the war.

The visitors reportedly were shopping for transport planes for the German airline now in the planning stage. They studied the big four-engine SE 2010 Armagnac and the smaller twin-engine SO 30P Bretagne.

It is believed that there also were discussions of Franco-German cooperation in aviation research and a plan to set up an aviation industry in North Africa.

Aviateca Seeking Services to U.S.

(McGraw Hill World News)

Guatemala City—Expanding Aviateca, Guatemala's government owned airline, is interested in scheduled passenger and cargo service into New Orleans and Miami and reportedly will file an application with CAB soon.

Aviateca is expected to request this service on the basis of reciprocity—Pan American and TACA International (of El Salvador) now run schedules to New Orleans from Guatemala, with PAA also providing service between Guatemala and Miami via Merida, Mexico. Aviateca has been working a nonsked service to New Orleans and Miami for several years.

But the airline may run into some hurdles on its "reciprocity" plea, neither PAA or TACA has even a temporary permit to serve Guatemala, despite ten years of negotiations. Both carriers operate their Guatemalan flights on a day to day basis.

American Airlines Net Income Down

American Airlines net profits of $5,100,000 the first half of this year isn't much lower than the $5,780,000 of a year ago, but pre-tax profit was down 36% to $9,949,000. This is despite a 15% gain in revenues to $86,857,000, with all sources of revenue participating in the gains.

Earnings per share dropped from 79 cents to 68 cents.

Some reasons for the strong net income showing: first half income tax last year was $9,770,000, this year $4,850,000, last year's first half profit originally reported at $6,532,868 was reduced $750,000 to make adjustment for the cost of later wage and fringe benefit increases.

Although business is excellent this summer, earnings were hurt earlier in the year by rising costs, sales slump around New York during the crash-ridden mid-winter period, and revenue losses and cost increases with the closing of Newark Airport.

CAB to Probe Frisco-L.A. Rates

Civil Aeronautics Board is investigating whether Western and United should not raise their Los Angeles-San Francisco fare from the present $11.70, or about 3½ cents a mile.

Interstate carrier California Central recently raised its rate to $13.50. Cal Central has complained to CAB that WAL and UAL are operating below cost. California Central, a non-subsidized airline, was losing money at the old rate, despite a high load factor and premium-speed Martin 2-0-2 service.

UAL and WAL recently raised all fares except this and United's $99 trans-continental fare by $1 per one way ticket.

The CAB investigation is to determine if the Western and United Los Angeles-San Francisco low rate is or will be "unjust or unreasonable, unduly preferential, or unduly prejudicial or unjustly discriminatory."

CELEBRATES SILVER ANNIVERSARY

Pilot's-eye view of the big San Francisco Airport. Stretching out into the bay, the airport early this month celebrated its 25th anniversary, the first major field on the West Coast to attain this distinction. Of interest are the two sets of dual runways. Its longest strip is 9,000 ft., the shortest 6,000 ft. Field's original 150 acres have grown to 3,700 acres. During its first month, the field had 57 flights, this month it will have handled about 9,500 airliners, providing the airport with $85,000 in revenues.

SHORTLINES

► **Air Transport Associates, Inc.**, Alaska-Seattle nonscheduled airline has lost its case in the Circuit Court of Appeals, Washington, D. C., against CAB revocation of its operating permit for flying too frequently. ATA, Inc. is expected to appeal to the U. S. Supreme Court.

► **Aircraft Industries Assn.** notes that 456 civil transports worth $473 million are on order now for delivery by 1954—130 this year, 202 next and 124 in 1954. Of these, 244 are 4-engined. Some 166 are for foreign lines.

► **American Airlines** overall load factor in June was 80.4%, the aircoach load factor was 93.5%. Its record 274,685,000 passenger miles topped last year by 11%.

► **Civil Aeronautics Board** has temporarily lifted the restriction that prevented air taxi operators from serving certificated helicopter passenger route areas. This is only pending final decision by CAB whether to go ahead with its proposed prevention of non-subsidized light, fixed-wing plane competition with certificated subsidized copter operations.

► **British European Airways** gets its first turboprop 40-passenger Vickers Viscount this October and plans scheduled passenger service by next March. Cruising speed is claimed at 350 mph. at 25,000 ft.

► **Delta Air Lines** has filed for SEC registration of 100,000 shares of $3 par common stock for public sale to help buy planes and other capital equipment and facilities. Company has 10 Convairs and four DC-7s on order at a cost of $13 million.

► **KLM Royal Dutch Airlines** has ordered three more Super Constellations, making total of 13. Delivery is slated for early next year. The Connies are planned for the growing emigrant traffic to Australia, New Zealand and Canada.

► **International Air Transport Assn.** reports interline transactions in May hit an all-time record of $18,885,000—8% over the previous record of last October and 39% over a year ago. Five-month total of $82,210,000 is up 32% from a year ago.

► **Lockheed Aircraft Co.** reports KLM, TCA and Air France are replacing crew radio headsets with loudspeakers in Super Connies on order. . . . President Robert Gross predicts jet transports will first use thick swept wings to house fuel, later go to straight, thin wings, with fuel in fuselage.

► **Northwest Airlines** load factor of 67% the first half of July compares with 77% of all July a year ago and 75% for last month. . . . Company now has CAB permission to fly local flights between Washington and Detroit, instead of serving that segment only on through service Minneapolis-Washington as required before by CAB. Flights must connect with N. Y.-Seattle, "thus minimizing any diversionary effect" on Capital's Detroit-Washington service.

► **Pan American World Airways** revenues the first five months this year are up 12% over a year ago to $58 million. . . . Company hopes to start trans-Pacific aircoach next year, President Juan Trippe has told stockholders, based on its "excellent" trans-Atlantic showing. . . . Company and TWA are ordered by CAB to resume Philadelphia-Europe service direct on Aug. 27.

► **Purdue Aeronautics Corp.** has CAB permission for limited use of not more than two DC-3s in charter service, and neither one may fly over 1,000 hr. a year of such service, says the Board.

► **Resort Airlines** has won CAB permission to fly passenger charter flights. The Big Four airlines, AAL, EAL, UAL and TWA, claimed Resort's certificate limited it to common carriage, all-expense tours.

► **Trans World Airlines** reports it will have all its 41 Martin 4-0-4s by late summer. . . . Company labor contract negotiations with flight engineers are being mediated by NMB.

► **United Air Lines** and Capital have broken off merger negotiations, UAL president W. A. Patterson has announced.

► **Transocean Air Lines** has purchased a DC-6 for irregular shuttle service California-Hawaii under the authority of the CAB.

► **Philippine Air Lines** starts service Manila-Zurich-Frankfurt July 30.

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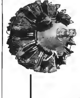

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19	1375F	Holley carburetor
407	SF9LN-2 (manufacturer' part No 10-12453-6 Spec. AN9511)	Bendix Scintilla Magneto
42	SF5RN-12 (manufacturer's part No 10-26170-1)	Bendix Scintilla Magneto
185,000	LS4AD1	Spark Plug (Aero)

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236	PR48-A1	Stromberg carburetor

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814	35814	Blower Ass'y
53	48382	Shaft
75	48383	Shaft
56	48392	Sump
390	48461	Gear
78	76236	Gear
1178	84289	Bearing
113	84487	Housing
77	84591C	Nose Housing
200	48350-D	Crankcase Ass'y
800	84083	Cylinder
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38	18597-2	Airesearch	Aluminum Oil Cooler
120	MF9-713-15A	Vickers	Hydraulic Pump
550	TFD 8600	Thompson	Fuel Booster Pump
125	D7818	Adel	Anti-icer Pump
250	AN4014	Eris Meter	Wobble (D-3) Pump
300	1H260-K & KA	Pesco	Hydraulic Pump
1000	AN5780-2	G. E.	Wheel & Flap Position Indicator
400	AN5780-2	Weston	Wheel & Flap Position Indicator
44	5BA25DJ4B	G. E.	DC Motor (1/2 HP)
50	RDB2220	Holtzer Cabot	DC Motor
115	P4CA2A	Parker	Primer
70	AN3212-1	Scintilla	Ignition Switch
450	A-9 (94-32226)	Nasco	Ignition Switch
687	RS-2	Mallory	Selector Rms
90	JH930-8	Jack & Heintz	Starter Motor
492	S-841 (94-32253)	Electronic Labs	Box
53	AN6203-3	Bendix	Accumulator 10"-1500 P.S.I.
1800	13018-A	Bendix	Interphone Box
148	R14949E	Marquette	Windshield Wiper Kit
188	EYLC 2334	Barber-Colman	Control
11	12088-1C	Eclipse	Amplifier
174	450-0	Skinner	Gasoline Filter
250	558-1A	Eclipse	Oil Separator
100	716-3A	Eclipse	Generator (NEA-3A)
37	157-47	Edison	Detector
89	318	Edwards	Horn
23	794-F	Stewart-Warner	Heater
230	921-B	Stewart-Warner	Heater (200000 BTU)
85	12924-2	Adel	Lock Valve
80	DW28	Eclipse	Transformer
97	6041H146A	Cutler Hammer	Relay (B-12)
22	0655-D	Aro	Oxygen Regulator
148	PG208A51	Minn. Honeywell	Air Ram Switch
33	DW47	Eclipse	Transformer
11	DW33	Eclipse	Transformer
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The Phonetic Alphabet

The latest change to effect the cockpit is a new phonetic alphabet, another ICAO standard which has been "accepted" by the U.S. Though minor in nature the subject illustrates several things.

Purported reason for the new alphabet was to produce a set of words more pronounceable by pilots from other countries. In this light, with the limited space available here, it is interesting to compare the old and new words.

▶**Fox to Foxtrot**—The letter F in the old code was FOX. For some reason this was considered unpronounceable so the scholars changed to FOXTROT! The old code used LOVE for the letter L. This was changed to LIMA (like in bean we presume). The old ITEM, for I, sounds like LIMA but apparently it was no good so I is now INDIA. The old word for J was JIG which has a sound like INDIA. But JIG was no good for it has become JULIET.

One of the bottlenecks of present aviation is communications. It is amazing to see what the new alphabet does for this problem. Instead of a 40-syllable code we now have one with 55, we had no three syllable words, now we have four, the old list had 11 words of one syllable, now we have only one.

In brief the new words are clumsy, they help bog down communications and do not appear to be more easily pronounced, even by foreigners.

A phonetic alphabet is supposed to eliminate mistaking one letter for another on the radio. Each word should be phonetically distinct from all others. It is here that the new words shine. Consider, for instance, the phonetic difference between VICTOR, NECTAR, DELTA and EXTRA, between COCA and OSCAR, between ECHO and METRO. (The counterparts in the code were VICTOR, NAN, DOG, and XRAY; CHARLIE and OBOE; EASY and MIKE.)

▶**Pilots Opposed**—The new alphabet, being an ICAO product, was designed for use by pilots of all nations. Since it is a CIVIL organization it is proper to suppose that they labor primarily in behalf of civilian aviation. It is interesting to note therefore, that at the recent meeting of the International ALPA, in Sydney, Australia, the civilian airline pilots of 17 nations voted against the new standard.

Backing up this international group, which included U. S. airline pilots, the domestic civilian pilots, represented 40,000 strong by AOPA, have also rejected the new list.

The ICAO standard presumably was the work of people well versed in languages. One thing is certain, they had little, if any, knowledge of the niceties of operating an airplane or of the problems of radio telephone communications. Since ICAO should have the pick of the world's aviation brains they should be able to produce consistently good results. It therefore is alarming to read such gibberish as the new alphabet.

It must also be noted that ICAO procedures come to American aviation by way of the Air Coordinating Committee and the CAA. So the remarks of the preceding paragraph must apply equally to these groups.

It is true that the new alphabet is a trivial thing. Pilots are simply paying little attention to it and going their usual way. At the same time there is no excuse for the added confusion; the old code was simple, people knew the words and it served its purpose.

There is of course one thing to be said in favor of the new alphabet. By happy coincidence it contains the correct number of words, exactly 26.

WHAT'S NEW

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Features of **Weipert toolroom and engine lathe** built in the U. S. Zone of Germany to American standards are described in bulletin available from Cincinnati Machine & Tool Co., Orchard St., Norwood, Cincinnati 12. . . **Cabin temperature control systems** for executive planes are described in Bulletin F 5221 being distributed by Barber-Colman Co., Rockford, Ill.

Case histories and engineering data for **Rollpin self-locking fasteners** are covered in comprehensive catalog available from Elastic Stop Nut Corp. of America, Sales Dept., 2330 Vauxhall Rd., Union, N. J. . . . **Precision components** for rapid and economical bread board and semi-permanent assembly of control systems instrumentation and analog computers are thoroughly described in 16-page catalog of Servomechanisms, Inc., Westbury, L. I., N. Y.

Oxygen catalog covering private and transport plane operations requirements is available from Scott Aviation Corp., Lancaster, N. Y. . . . **Yesterday and tomorrow**, details in pictures and text the history and development of Hiller Helicopters, Inc., Palo Alto, Calif. . . Chemical processing operations necessary in the metal working industry are described in booklet **Serving the Metal-Working Industry** being distributed by Turco Products, Inc., Los Angeles.

Data and dimensions are given for **Parkone molded compound O-rings** for extreme temperature conditions in Catalog 5160A1. Write Parker Appliance Co., 17325 Euclid Ave., Cleveland. . . . **Booklet** describing operation of hand portable and fixed installation tachometers, including circuit diagrams, is available at Metron Instrument Co., 432 Lincoln St., Denver 9, Colo.

ADVERTISERS IN THIS ISSUE

AVIATION WEEK—JULY 28, 1952

LETTERS

Fueling Airliners

On May 21, I had occasion to see my family off at La Guardia Field. They boarded American Airlines Flight 17 scheduled to leave for Chicago at 10 AM EST. At the time they boarded, about 15 minutes before flight time, a Texaco fuel truck was parked under the left wing of the aircraft with fueling hoses extended and nozzles inserted in the two left wing tanks. No attendants were on hand at the nozzles, and no driver was in the truck. In addition, the only fire extinguishers in view were unattended in their racks on the front of the truck.

Presently, two attendants sauntered into view, mounted the wing and began fueling. When fueling was completed the hoses were tossed carelessly onto the truck. One of the attendants removed the ground wire from its connection in the pavement and cockeyed the truck around the aircraft into position under the right wing and completed fueling there in the same manner.

At no time were any fire extinguishers attended or in evidence aboard or boarding the plane during the entire fueling operation. I believe that an attendant, possibly the stewardess, was stationed at the open entrance of the aircraft during the fueling.

I understand that the foregoing was in accordance with CAA regulations. However, with the picture in my mind of the flaming Constellation burning at Idlewild, it occurred to me that things could get quite hot for the passengers on Flight 17 if a fire should start as it did with the Connie.

With safety the prime consideration, it appears that the air lines are missing a good bet in not requiring passengers to deplane during fueling. It can be argued that deplaning passengers would cause them inconvenience. But it would be most inconvenient to cook any more passengers than absolutely necessary.

I would like to have your comments on this.

Robert K. Dunn
185 Lincoln Street
Englewood, N. J.

Fun Near Hamburg

In one of your recent issues you published a letter by one of your subscribers complaining about the fact that "there's no fun anymore in aviation."

Well, I think he's looking at the story from the wrong angle. There exists here in Hamburg a group of some 30 people, all glider pilots, of which I am a member. There are no professional airmen, no aeronautical engineers or air aces among our group. We're just weekend pilots, if you know what I mean. Nevertheless, during the last six months or so we "re"-constructed —virtually from scrap—two sailplanes and are about half through with another.

In addition, we built a transport trailer for those two planes and converted a used car into a winch for sailplane launching. Besides, we had to spend several Sundays leveling and policing our 'air field.' And now we're at it every weekend.

We seldom ever have any money. We don't get any support, nor do we want it. We're carpenters, clerks, farmhands, doctors. We're just weekend pilots. We hardly ever spend more than a couple of minutes in the air. So why do we do it? Well, I guess there must still be some fun in aviation—even if it's only sailplane flying. Your subscriber—or rather ex-subscriber—should try it.

By the way, I just remembered I should tell you that I think your magazine is pretty good.

Jurgen Rosenstock
Eilenau 12
Hamburg 24, Germany

From DH Airspeed

We acknowledge your circular letter requesting us to renew our subscription for AVIATION WEEK. This we would like to do for a period of two years. . . . We would like to take this opportunity to thank every one concerned in producing such an interesting publication to the aircraft industry as AVIATION WEEK.

T. R. Hilton, Public Relations Dept.
The De Havilland Aircraft Co., Ltd.
Airspeed Division
Hampshire, England

Rocket Model

We want to thank you for what we feel is a very excellent article ("Rocket Model Does Work of Wind Tunnel"—June 9) well presented. We have already received a number of compliments.

R. G. Hoof, Aircraft Sales Manager
Bendix Pacific Division
North Hollywood, Calif.

From Flight Engineer

In reference to Capt. Robson's article recently, he makes the statement:

Confusion compounded. These steps merely add to the confusion. We already have an overabundance of regulations. Pilots must necessarily spend a disproportionate amount of time trying to stay legal. This diverts time and energy from flying safely. Likewise, the cockpit of the modern airliner is cluttered with gadgets whose function it is to check the adjacent instrument because none of them is to be trusted alone.

I do not believe the cockpits are cluttered with gadgets. The instrumentation system of a modern aircraft is as reliable as the rest of the aircraft.

How many times has the ILS instrument failed at a critical moment? What about dual installation of this unit? Similarly, engine instruments are just as reliable.

If the gadgets impose too great a load on the pilots, why not let the flight engineer get into the act? Pilots have been training themselves for years to monitor and interpret their flight instruments. The flight engineer, *properly utilized*, can interpret engine and system instrumentation and detect an impending failure which may result in an emergency the same as a pilot can tell the aircraft is diverted from the prescribed flight path by interpreting the flight panel instruments.

For example, a pilot making an ILS approach finds himself to one side of the localizer. He immediately initiates corrective action to regain the proper course of the aircraft. Similarly, the flight engineer can foresee troubles in engine and system operation by knowing how to interpret the relative instruments. He, too, can then apply the proper corrective action.

Consider this other statement, "In fact, if pilots and their passengers are to survive, we must simplify."

I doubt if Capt. Robson can show us one instrument or control that is not entirely essential at sometime or another. Consequently, simplification without sacrificing reliability and safety on the current equipment could be practically disregarded.

With the advent of larger, faster and heavier aircraft, simplification will become a must, but this can only be accomplished by new types of systems and component units.

What is necessary is the proper utilization of the personnel already available. This means allowing the flight engineer more responsibility in mechanical operations of the equipment now flying the lines, thereby relieving the work load of the pilots and allowing them to 'Stay Legal.'

What this all amounts to is, that as aviation has progressed and equipment has, of necessity, become more complex, the work load on the pilots has increased to the point where safety may become a concerning factor. The flight engineer is the logical man to relieve this work load. The captain and engineer of ships at sea have a very workable situation. Why not allow the same to prevail on the larger airliners?

Harold D. Coonley, Flight Engineer
Eastern Air Lines
Miami Springs, Fla.

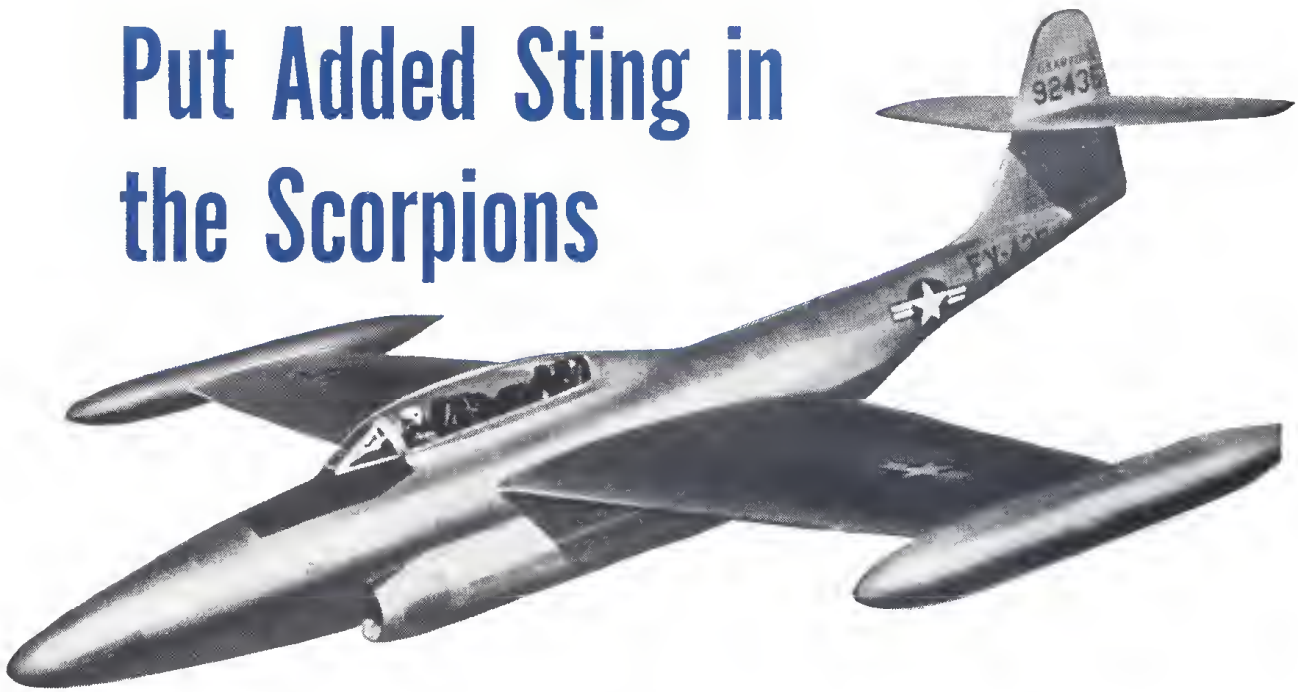
New Ideas

. . . You deserve a beer for your statesman like editorial in a recent issue . . . featuring "new ideas." Five words—and I quote—"FOR THOSE WHO WOULD SEE" make for real reading from where a few of us sit today. In fact I am going to use just those words as my theme in the next few speeches I get hooked for.

C. M. Belinn,
President
Los Angeles Airways, Inc.
Airport Station
Los Angeles 45, Calif.

(Editor Robert H. Wood, whose editorials usually appear on this page, is on vacation.)

New, More Powerful Allison Jet Engines Put Added Sting in the Scorpions



THE NORTHROP SCORPION F-89C — newest all-weather jet interceptor for the Air Force—gets a big power boost from two new Allison J35 engines.

With take-off thrust in the new J35-A-33 engines greatly increased over previous models in the F-89 series, the Scorpion remains the highest-powered interceptor in production in the world today.

This increased power from the improved Allison engines gives the aircraft faster take-off—higher rate of climb—even with heavier fire power and radar equipment.

Pilots now pack a special Sunday punch in their round-the-clock patrol for any intruders approaching our shores.

Today, Allison engines are depended upon *exclusively* to power the interceptors which guard our shores—a demonstration of confidence based on the unequalled experience of more than 1,700,000 hours in the air—*more time, under all conditions, than all other jet engines combined.*

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